



Municipality of Singapore

HEALTH DEPARTMENT

ANNUAL REPORT

for

1927

[Hawthorn P.S.]

SINGAPORE:

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1928.



MUNICIPAL HEALTH OFFICE.

Singapore, 27th April, 1928.

To,

THE PRESIDENT,

MUNICIPAL COMMISSIONERS,

SINGAPORE.

SIR,

I have the honour to report as follows for the year 1927.

1. ZYMOTIC DISEASE.

There were 1294 cases notified compared with 1165 in 1926 and with 962 in 1925.

The following table shows the comparison between this year and the previous ten years:—

| Year. | Small-pox. | Plague. | Enteric Fever. | Cholera. | Diphtheria. | Erysipelas. | Chicken-pox. | Puerperal Fever. | Paratyphoid Fever. | Cerebro-Spinal-fever. | Scarlet Fever. | Typhus Fever. | Tuberculosis. | Total. |
|-------------------------|------------|---------|----------------|----------|-------------|-------------|--------------|------------------|--------------------|-----------------------|----------------|---------------|---------------|--------|
| 1917 .. | 33 | 45 | 120 | 8 | 37 | 4 | 118 | 20 | 4 | 7 | — | — | — | 396 |
| 1918 .. | 11 | 176 | 287 | — | 31 | 4 | 107 | 8 | 2 | 5 | — | — | 104 | 735 |
| 1919 .. | 14 | 11 | 174 | 75 | 42 | 3 | 34 | 14 | 3 | 22 | — | — | 866 | 1258 |
| 1920 .. | 4 | 61 | 129 | 33 | 33 | 1 | 68 | 15 | 2 | 29 | — | — | 520 | 895 |
| 1921 .. | 150 | 28 | 127 | 1 | 49 | 11 | 119 | 13 | 4 | 70 | — | — | 319 | 891 |
| 1922 .. | 268 | 39 | 68 | 1 | 52 | 7 | 127 | 16 | 2 | 32 | — | — | 169 | 781 |
| 1923 .. | 3 | 52 | 63 | — | 37 | 14 | 188 | 12 | 1 | 9 | — | — | 409 | 788 |
| 1924 .. | 9 | 20 | 64 | 11 | 38 | 9 | 230 | 22 | — | 16 | — | — | 331 | 750 |
| 1925 .. | 10 | 59 | 136 | 1 | 51 | 2 | 31 | 14 | 2 | 10 | — | — | 365 | 962 |
| 1926 .. | 34 | 7 | 197 | 22 | 46 | 14 | 169 | 25 | 1 | 6 | 1 | 1 | 642 | 1165 |
| Average for 10 years .. | 53.6 | 49.8 | 136.5 | 15.2 | 41.6 | 6.9 | 119.1 | 15.9 | 2.1 | 20.6 | — | — | — | — |
| 1927 .. | 19 | 4 | 235 | 30 | 29 | 5 | 193 | 22 | 7 | 17 | — | — | 733 | 1294 |

The following return shows the number of notifiable diseases for each month of the year:—

| | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|-------------------------|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|-------|
| Enteric Fever .. | 10 | 12 | 10 | 8 | 22 | 26 | 15 | 22 | 27 | 33 | 24 | 26 | 235 |
| Diphtheria .. | 3 | 1 | 3 | 3 | 1 | 3 | 2 | 2 | 3 | 2 | 5 | 1 | 29 |
| Chicken-pox .. | 21 | 8 | 16 | 18 | 40 | 14 | 20 | 8 | 13 | 9 | 6 | 20 | 193 |
| Puerperal Fever .. | 1 | 1 | 1 | 4 | 2 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | 22 |
| Erysipelas .. | — | 2 | — | 1 | — | 1 | 1 | — | — | — | — | — | 5 |
| Cerebro-spinal Fever .. | — | 1 | — | 5 | 2 | 3 | — | — | 2 | 1 | 3 | — | 17 |
| Tuberculosis .. | 69 | 43 | 45 | 61 | 69 | 59 | 70 | 62 | 46 | 64 | 81 | 64 | 733 |
| Paratyphoid Fever.. | — | — | 2 | 2 | 2 | — | — | 1 | — | — | — | — | 7 |
| Small Pox .. | 4 | 1 | 2 | — | 6 | 3 | — | 1 | 1 | — | 1 | — | 19 |
| Plague .. | — | — | — | 1 | — | — | — | 2 | — | — | 1 | — | 4 |
| Cholera .. | — | 1 | — | — | — | — | — | — | 1 | 1 | 10 | 17 | 30 |
| Total .. | 108 | 70 | 79 | 103 | 144 | 111 | 109 | 99 | 94 | 113 | 133 | 131 | 1294 |

The following table shows the incidence by nationalities:—

| | Europeans | Eurasians | Chinese | Malays | Indians | Others | Total |
|-------------------------|-----------|-----------|---------|--------|---------|--------|-------|
| Enteric Fever .. | 9 | 7 | 195 | 6 | 12 | 6 | 235 |
| Diphtheria .. | 7 | 4 | 16 | 1 | — | 1 | 29 |
| Chicken-pox .. | — | 11 | 29 | 4 | 147 | 2 | 193 |
| Puerperal Fever .. | — | 2 | 14 | 1 | 5 | — | 22 |
| Erysipelas .. | — | — | 5 | — | — | — | 5 |
| Cerebro-spinal Fever .. | — | — | 12 | 1 | 4 | — | 17 |
| Tuberculosis .. | 7 | 12 | 547 | 45 | 104 | 18 | 733 |
| Paratyphoid Fever .. | 1 | — | 6 | — | — | — | 7 |
| Small-pox .. | 2 | — | 5 | 10 | 2 | — | 19 |
| Plague .. | — | — | 4 | — | — | — | 4 |
| Cholera .. | — | 1 | 25 | — | 4 | — | 30 |
| Total .. | 26 | 37 | 858 | 68 | 278 | 27 | 1294 |

SMALL-POX.

During the year there were 19 cases, of whom 2 were Europeans, a husband and wife, 5 were Chinese, 10 were Malays and 2 were Indians. 7 of the cases died.

PLAGUE.

There were 4 cases only, all Chinese, with 3 deaths. The cases were separated both in time and place and no connection between them could be made out.

4137 Rats were examined during the year at the laboratory but none were found infected.

CHOLERA.

There were 30 cases in all, 1 Eurasian, 25 Chinese and 4 Indians. There were 16 deaths. 8 of the cases were discovered after death.

10 of the cases occurred in November and 17 in December. With the exception of a definite outbreak of 8 cases in the Government Lunatic Asylum, very little connection could be made out between the other cases. The Asylum cases commenced with a patient who had been in the institution for four years, and all the cases occurred between 22/12/27 and 27/12/27, so that the likelihood is that they were all infected from the same source at the same time.

Of the other cases several were found dead. The bodies were, in some instances, obviously dumped far from where death had occurred making it impossible, as already said, to trace any connection between them.

ENTERIC.

235 cases were notified as against 197 during the previous year. But 163 deaths were recorded from this cause so that as in previous reports, I have to say that the number of notifications gives no indication of the amount of the disease. Allowing a case mortality rate of 15 to 20% would mean there must have been 800 to 1000 cases. These figures are in all probability much nearer the truth.

With slight exceptions in some months, the cases were evenly spaced throughout the year and at no time was there any sign of an epidemic, indicating that there was no common source of infection but that each case or group of cases was contracted from a previous case or "Carrier" through the medium, probably, of infected food supplies.

TUBERCULOSIS.

733 cases were notified but 1523 deaths were registered as being due to this cause, so that in this case also the notification returns are of no value in estimating the prevalence of this scourge.

None of the other zymotic diseases call for special comment.

GENERAL.

(1) Medical Inspection of Passengers.

184 permits to land were granted to 379 passengers 18 of whom failed to report for inspection.

(2) Disinfection of Infected articles.

2865 articles, of an approximate value of \$3,765, were passed through the steam disinfecter. This was used on 24 occasions, and charged 35 times. On all occasions it worked well.

(3) Houses quarantined and disinfected.

37 houses were quarantined, all being released by the end of the year. 977 houses (Phthisis cases 724) were disinfected. Two attap huts of an approximate value of \$100 were destroyed. No compensation was paid.

(4) Infected persons and contacts.

334 persons were removed to hospital, 195 contacts were sent to St. Johns, 13 bodies were removed for autopsy, and 59 bodies were buried under supervision.

II. MIDDLETON HOSPITAL.

At the end of 1926 there were 33 patients remaining in hospital. During 1927 there were 517 admissions making a total treated of 550. Of these, 486 were discharged, 34 died while 30 remained in hospital at the end of the year.

The report of the Medical Superintendent is appended.

III. VACCINATION.

The following vaccinations were reported:—

| | Successful. | Modified. | Failed. | Not Seen. | Total. |
|--------------------------|-------------|-----------|---------|-----------|--------|
| Medicalmen .. | 1,237 | — | 1 | 3 | 1,241 |
| Private Vaccinators .. | 1,667 | — | 4 | 3 | 1,674 |
| Municipal Vaccinators .. | 7,379 | 66 | 9 | 35 | 7,489 |
| Total .. | 10,283 | 66 | 14 | 41 | 10,404 |

Of the total number of 7489 vaccinations performed by the Municipal Vaccinators 7379 or 98.5 per cent were successful, 9 were unsuccessful, 66 were modified and 35 remained to be seen a second time.

The nationalities of those vaccinated by Municipal Vaccinators were:—Europeans 33, Eurasians 109, Chinese 5702, Malays 764, Indians 770, others 111. Of these 4021 were males and 3468 females of the following ages:—

| | | | |
|---------------------|----|----|------------------|
| Under 1 year of age | .. | .. | 4068 |
| Between 1 & 2 years | .. | .. | 1661 |
| „ 2 & 5 „ | .. | .. | 307 |
| „ 5 & 10 „ | .. | .. | 201 |
| „ 10 & 20 „ | | .. | 358 |
| Unknown | .. | .. | 894 |
| | | | <hr/> 7489 <hr/> |

At the municipal vaccination stations there were performed 3462 vaccinations, at Police Stations 2905 at houses 616, at Child Welfare clinics 132, at Schools 138 and of contacts 236.

2545 tubes of lymph were used by the Municipal Vaccinators being equivalent to an average of 2.9 persons per tube.

4068 infants under one year were vaccinated by the Municipal Vaccinators. Allowing that all the vaccinations carried out by medical practitioners and private vaccinators were upon infants, which is unlikely, though their proportion of infants is likely to be higher than that of the Public Vaccinators, we have a total of 6972 infants vaccinated during the year. But there were 14,152 infants born. Of these 3221 died before attaining one year. Allowing that none of these latter were vaccinated, which is, of course, extremely unlikely, we have a total of 10,931, which still leaves upwards of 4000 unaccounted for. This figure would represent the minimum unvaccinated but I am inclined to think the number is nearer 6000 than 4000. In other words vaccination of infants is not being efficiently carried out.

I have not been satisfied with the vaccination state for some time and a serious attempt must and will be made to rectify it. Hitherto the duty of rounding up the infants and having them brought to the various police stations and depots for vaccination has belonged to the Police, but for many reasons, for which the Police can hardly be blamed, this method has never been satisfactory, and in fairness to the Police I must admit that, recently, at any rate, the duty has not been of their seeking. Anyhow the position was becoming dangerous and provision was therefore made for 1928 for the appointment of two more municipal vaccinators, while the rounding up of the infants has been incorporated in the duties of the Asiatic Health Visitors attached to the infant welfare clinics.

The method to be followed in future will be that whenever an infant of over six months is found by a visitor to be unvaccinated it will be her duty to warn the parents where to take the child to be vaccinated. At the same time she will report the name and address to the municipal vaccinator whose duty it will then become to follow up the child, to its home even if necessary, and see that it is vaccinated.

At the same time it is hoped that the magistrates will take a much more serious view in prosecutions for failure to vaccinate than they have hitherto done. A few substantial fines would go a long way to bring parents to a proper realisation of their duties in regard to the vaccinated state of their children.

IV. VITAL STATISTICS.

The following statistics are calculated on an estimated mean annual population of 428,153 made up as follows:—

| | | Males | Females | Total |
|-----------|----|---------|---------|---------|
| Europeans | .. | 3,276 | 1,606 | 4,882 |
| Eurasians | .. | 2,444 | 2,754 | 5,198 |
| Chinese | .. | 221,783 | 116,283 | 338,066 |
| Malays | .. | 20,214 | 17,388 | 3,7602 |
| Indians | .. | 29,396 | 5,736 | 35,132 |
| Others | .. | 4,115 | 3,158 | 7,273 |
| | | <hr/> | <hr/> | <hr/> |
| Total | .. | 281,228 | 146,925 | 428,153 |
| | | <hr/> | <hr/> | <hr/> |

The following return gives the population, the number and rates per 1000 of birth, infantile deaths and deaths at all ages for the last 10 years:—

| Year | Population. | Births. | | Infantile deaths | | Deaths at all ages | |
|-----------------------|-------------|---------|-------|------------------|-------|--------------------|-------|
| | | No. | Rate. | No. | Rate. | No. | Rate. |
| 1917 .. | 304,815 | 8,156 | 26.75 | 2,447 | 300.0 | 11,900 | 35.75 |
| 1918 .. | 312,995 | 8,065 | 25.76 | 2,131 | 264.2 | 13,172 | 41.08 |
| 1919 .. | 321,480 | 8,535 | 26.54 | 2,234 | 251.7 | 10,756 | 33.45 |
| 1920 .. | 330,303 | 8,969 | 27.15 | 2,233 | 248.9 | 11,731 | 35.51 |
| 1921 .. | 351,461 | 10,237 | 29.12 | 2,383 | 232.7 | 11,947 | 33.99 |
| 1922 .. | 362,597 | 10,368 | 28.59 | 2,488 | 239.9 | 11,553 | 31.86 |
| 1923 .. | 373,513 | 10,757 | 28.79 | 2,431 | 225.9 | 10,049 | 26.90 |
| 1924 .. | 384,758 | 11,757 | 30.55 | 2,614 | 222.3 | 10,420 | 27.08 |
| 1925 .. | 396,341 | 12,363 | 31.19 | 2,600 | 210.3 | 11,184 | 28.21 |
| 1926 .. | 408,273 | 12,871 | 31.52 | 2,987 | 232.0 | 13,085 | 32.04 |
| Average 10 years . | 354,653 | 10,207 | 28.59 | 2,454 | 242.7 | 11,579 | 32.58 |
| 1927 .. | 428,153 | 14,152 | 33.05 | 3,221 | 227.6 | 14,165 | 33.08 |

1. BIRTHS.

The total number of births registered during the year was 14,152 compared with 12,871 in 1926 and 12,363 in 1925.

There were 7,520 male and 6,632 female births.

The birth rate was 33.05 per mille as compared with 31.52 in 1926 and 31.19 in 1925.

The birth rate is the highest recorded.

The following return gives the number of births and the birth rate for each month of the year:—

| Month. | Births. | Birth Rate. | Month. | Births. | Birth Rate. |
|-------------|---------|-------------|--------------|---------|-------------|
| January .. | 1,061 | 29.73 | July .. | 1,125 | 31.53 |
| February .. | 938 | 26.28 | August .. | 1,281 | 35.90 |
| March .. | 1,132 | 31.72 | September .. | 1,189 | 33.32 |
| April .. | 1,207 | 33.82 | October .. | 1,284 | 35.98 |
| May .. | 1,159 | 32.48 | November .. | 1,317 | 36.91 |
| June .. | 1,176 | 33.01 | December .. | 1,281 | 35.90 |

The following return shows the number of births and birth rate for each nationality:—

| | Males. | Females. | Total. | Birth Rate. |
|--------------|--------|----------|--------|-------------|
| Europeans .. | 76 | 61 | 137 | 28.06 |
| Eurasians .. | 86 | 75 | 161 | 30.97 |
| Chinese .. | 6,153 | 5,393 | 11,546 | 34.15 |
| Malays .. | 765 | 665 | 1,430 | 38.02 |
| Indians .. | 349 | 349 | 698 | 19.86 |
| Others .. | 91 | 89 | 180 | 24.74 |
| Total .. | 7,520 | 6,632 | 14,152 | 33.05 |

There were 448 still births compared with 407 in 1926.

2. DEATHS.

The total number of deaths for the year was 14,165 and the death rate 33.08 per 1000 compared with 32.04 in 1926 and 28.21 in 1925.

One thousand persons died who had been less than 3 months resident in Singapore. Deducting these the death rate is reduced to 30.74 per 1000.

The excess of deaths over births was 13.

The following return gives the number of deaths and the death rate for each month of the year:—

| Month. | Deaths. | Death Rate | Month. | Deaths. | Death Rate |
|-------------|---------|------------|--------------|---------|------------|
| January .. | 1,042 | 29.20 | July .. | 1,325 | 37.13 |
| February .. | 928 | 26.00 | August .. | 1,339 | 37.52 |
| March .. | 1,069 | 29.96 | September .. | 1,186 | 33.24 |
| April .. | 1,149 | 32.20 | October .. | 1,281 | 35.90 |
| May .. | 1,281 | 35.90 | November .. | 1,178 | 33.01 |
| June .. | 1,237 | 34.67 | December .. | 1,150 | 32.23 |

MORTALITY BY NATIONALITIES.

The following return gives the number of deaths from each cause among males and females of the different nationalities. The classification followed is that of the International list (1912).

| DISEASE. | | | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL |
|-----------------------------|-------------------------------|----|----|-----|-----------|-----------|---------|--------|---------|--------|-------|
| I. General Diseases. | | | | | | | | | | | |
| 1. | Enteric Fever | .. | .. | M | 4 | 2 | 123 | 3 | 3 | — | 135 |
| | | | | F | — | — | 27 | — | 1 | — | 28 |
| 4. | Malaria | .. | .. | M | 1 | 1 | 853 | 80 | 120 | 2 | 1,057 |
| | | | | F | — | 2 | 173 | 42 | 13 | — | 230 |
| 5. | Small-pox | .. | .. | M | — | — | 2 | — | — | — | 2 |
| | | | | F | — | — | 2 | 3 | — | — | 5 |
| 6. | Measles | .. | .. | M | — | — | 5 | — | — | — | 5 |
| | | | | F | — | — | 3 | — | — | — | 3 |
| 8. | Whooping Cough | .. | .. | M | — | — | — | — | — | — | 0 |
| | | | | F | — | — | 1 | — | — | 1 | 2 |
| 9-A. | Diphtheria | .. | .. | M | — | 1 | 4 | 1 | — | — | 6 |
| | | | | F | — | — | 3 | — | — | — | 3 |
| 10. | Influenza | .. | .. | M | 2 | — | 17 | 32 | 10 | 1 | 62 |
| | | | | F | 1 | 1 | 24 | 24 | 4 | 2 | 56 |
| 12. | Cholera | .. | .. | M | — | — | 13 | — | 1 | — | 14 |
| | | | | F | — | — | — | — | — | — | 0 |
| 14. | Dysentery | .. | .. | M | 2 | 1 | 516 | 24 | 31 | 2 | 576 |
| | | | | F | — | 1 | 99 | 12 | 10 | 1 | 123 |
| 15. | Plague | .. | .. | M | — | — | 3 | — | — | — | 3 |
| | | | | F | — | — | — | — | — | — | 0 |
| 17. | Leprosy | .. | .. | M | — | — | 16 | — | 1 | — | 17 |
| | | | | F | — | — | 7 | 1 | — | — | 8 |
| 18. | Erysipelas | .. | .. | M | — | — | 2 | — | — | — | 2 |
| | | | | F | — | — | — | — | — | — | 0 |
| 19-D. | Other diseases included under | .. | .. | M | — | — | — | — | — | 1 | 1 |
| 19 | | | | F | — | — | — | — | — | — | 0 |
| 20-A. | Pyæmia | .. | .. | M | — | — | 5 | — | — | — | 5 |
| | | | | F | — | — | 4 | 1 | — | — | 5 |
| 20-B. | Septicæmia | .. | .. | M | — | — | 40 | 1 | 3 | — | 44 |
| | | | | F | — | — | 10 | 1 | 1 | — | 12 |
| 24. | Tetanus | .. | .. | M | — | — | 46 | — | 4 | — | 50 |
| | | | | F | — | 1 | 28 | 2 | — | — | 31 |
| 27. | Beri Beri | .. | .. | M | — | 1 | 841 | 51 | 12 | — | 905 |
| | | | | F | — | — | 148 | 21 | 1 | 3 | 173 |
| 28-A. | Pulmonary Tuberculosis | .. | .. | M | 3 | 5 | 501 | 34 | 48 | 11 | 602 |
| | | | | F | — | 5 | 52 | 15 | 12 | 3 | 87 |
| 28-B. | Phthisis | .. | .. | M | — | — | 473 | 42 | 23 | — | 538 |
| | | | | F | — | — | 160 | 36 | 12 | 1 | 209 |
| 29-B. | Miliary Tuberculosis | .. | .. | M | — | — | 13 | — | 4 | — | 17 |
| | | | | F | — | — | — | — | — | — | 0 |

| DISEASE. | | | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | | |
|----------|---|----|---|-----|-----------|-----------|---------|--------|---------|--------|-------|---|-----|
| 30. | Tuberculous Meningitis | .. | { | M | — | — | 10 | — | 3 | — | 13 | } | 24 |
| | | | | F | — | 1 | 10 | — | — | — | 11 | | |
| 31-A. | Tabes Mesenterica | .. | { | M | — | — | 2 | — | — | — | 2 | } | 9 |
| | | | | F | — | — | 7 | — | — | — | 7 | | |
| 31-B. | Other peritoneal and intestinal tubercle | .. | { | M | — | — | 4 | 1 | — | 1 | 6 | } | 7 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 32. | Tuberculosis of spinal column | | { | M | — | — | 6 | — | 1 | — | 7 | } | 11 |
| | | | | F | — | — | 4 | — | — | — | 4 | | |
| 33. | Tuberculosis of Joints | .. | { | M | — | — | 2 | 2 | — | — | 4 | } | 4 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 34-C. | Other Tuberculosis included under 34 | .. | { | M | — | — | 2 | 1 | 1 | — | 4 | } | 6 |
| | | | | F | — | — | 2 | — | — | — | 2 | | |
| 35. | Disseminated Tuberculosis | .. | { | M | — | — | 7 | — | — | 1 | 8 | } | 9 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 36-A. | Rickets | .. | { | M | — | — | — | — | — | — | 0 | } | 1 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 37. | Syphilis | .. | { | M | 1 | — | 96 | 4 | 7 | — | 108 | } | 141 |
| | | | | F | — | — | 31 | 1 | 1 | — | 33 | | |
| 38-A. | Soft Chancre | .. | { | M | — | — | — | — | 1 | — | 1 | } | 1 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 38-B. | Gonococcus Infection | .. | { | M | — | — | 4 | — | — | 1 | 5 | } | 5 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 39. | Cancer of the Buccal Cavity | .. | { | M | 1 | — | 2 | — | 2 | 1 | 6 | } | 7 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 40. | Cancer of the Stomach, Liver, &c. | .. | { | M | — | — | 67 | 4 | 4 | — | 75 | } | 95 |
| | | | | F | — | 1 | 11 | 4 | 4 | — | 20 | | |
| 41. | Cancer of the Peritoneum, Intestines and Rectum | .. | { | M | 1 | — | 4 | — | 1 | — | 6 | } | 10 |
| | | | | F | — | 1 | 2 | — | 1 | — | 4 | | |
| 42. | Cancer of the female genital organs | .. | { | M | — | — | — | — | — | — | 0 | } | 12 |
| | | | | F | — | 1 | 8 | 1 | — | 2 | 12 | | |
| 43. | Cancer of the breast | .. | { | M | — | — | — | — | — | — | 0 | } | 7 |
| | | | | F | — | — | 6 | 1 | — | — | 7 | | |
| 44. | Cancer of the skin | .. | { | M | — | — | 1 | — | — | — | 1 | } | 1 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 45. | Cancer of other or unspecified organs | .. | { | M | 2 | 1 | 11 | 2 | 3 | — | 19 | } | 24 |
| | | | | F | 1 | — | 3 | — | — | 1 | 5 | | |
| 46-C. | Other Tumours | .. | { | M | — | — | — | — | — | — | 0 | } | 1 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 47. | Rheumatic Fever | .. | { | M | — | — | 3 | 1 | — | — | 4 | } | 4 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 48-A. | Chronic Rheumatism | .. | { | M | — | — | 2 | — | — | — | 2 | } | 3 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |
| 48-B. | Osteo-arthritis | .. | { | M | — | — | 1 | — | — | — | 1 | } | 1 |
| | | | | F | — | — | — | — | — | — | 0 | | |
| 49. | Scurvy | .. | { | M | — | — | — | — | — | — | 0 | } | 1 |
| | | | | F | — | — | 1 | — | — | — | 1 | | |

| DISEASE. | | | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|--|---|----|----|----------|-----------|-----------|----------|--------|---------|--------|----------|----|
| 50. | Diabetes | .. | .. | { M F | — — | — 2 | 5 7 | 1 — | — — | — — | 6 9 | 15 |
| 53-A. | Leucocythaemia | .. | .. | { M F | — — | — — | 1 — | — — | — — | — — | 1 0 | 1 |
| 54. | Anaemia | .. | .. | { M F | — — | — 1 | 12 4 | 2 2 | 4 2 | 1 — | 19 9 | 28 |
| 55-D. | Other diseases included under 55 | | | { M F | — — | — — | 11 4 | 4 2 | — 1 | — — | 15 7 | 22 |
| 56. | Alcoholism | .. | .. | { M F | 1 — | — — | 2 — | — — | — — | — — | 3 0 | 3 |
| 59. | Other Chronic Poisonings | .. | | { M F | — — | — — | 1 — | — — | — — | — — | 1 0 | 1 |
| II. Diseases of the Nervous System and of the Organs of Special Sense. | | | | | | | | | | | 5,470 | |
| 60. | Encephalitis | .. | .. | { M F | — — | — — | 2 — | 1 — | 1 — | — — | 4 0 | 4 |
| 61-A. | Cerebro Spinal Fever | .. | .. | { M F | — — | — — | 10 — | — — | 2 — | — — | 12 0 | 12 |
| 61-B. | Posterior basal Meningitis | .. | | { M F | — — | — — | 2 — | — — | — — | — — | 2 0 | 2 |
| 61-C. | Meningitis—other forms | .. | | { M F | — 1 | — — | 11 4 | — — | 5 — | 1 1 | 17 6 | 23 |
| 62. | Locomotor Ataxy | .. | .. | { M F | — — | — — | 2 — | — — | — — | — — | 2 0 | 2 |
| 63-A. | Diseases formerly classed to "Other Nervous Affections" | | | { M F | — — | — — | — 1 | — — | — — | — — | 0 1 | 1 |
| 63-B. | Other diseases included under 63 | .. | .. | { M F | — — | — — | 1 1 | — — | 1 — | — — | 2 1 | 3 |
| 64-A. | Apoplexy | .. | .. | { M F | — — | 1 1 | 9 6 | — — | 1 1 | — — | 11 8 | 19 |
| 64-E. | Cerebral Haemorrhage | .. | | { M F | 3 — | — 1 | 43 17 | — 2 | 2 — | — 1 | 48 21 | 69 |
| 65. | Softening of Brain | .. | .. | { M F | 1 — | 1 — | 4 — | — — | 2 — | — — | 8 0 | 8 |
| 66-A. | Hemiplegia | .. | .. | { M F | — — | 2 — | 16 9 | 1 1 | 4 — | — — | 23 10 | 33 |
| 66-B. | Paraplegia | .. | .. | { M F | — — | — — | 13 2 | — 1 | 1 — | — — | 14 3 | 17 |
| 66-C. | Other forms of paralysis | .. | | { M F | — — | — — | 1 2 | — — | 1 — | — — | 2 2 | 4 |
| 67. | General paralysis of the insane | | | { M F | — — | — — | 10 — | 1 — | 2 — | 1 — | 14 0 | 14 |
| 68. | Other forms of mental alienation | .. | .. | { M F | — — | — — | 2 1 | — — | — — | — — | 2 1 | 3 |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL |
|--|--|-----|-----------|-----------|---------|--------|---------|--------|-------|
| 69. | Epilepsy | M | — | — | 1 | — | — | — | 1 |
| | | F | — | 1 | 1 | — | — | — | 2 |
| 70-B. | Other diseases included under 70 | M | — | — | 14 | 1 | 1 | — | 16 |
| | | F | — | — | 18 | — | — | — | 18 |
| 71-B. | Other Infantile Convulsions .. | M | — | 3 | 615 | 158 | 26 | 3 | 805 |
| | | F | 1 | 3 | 454 | 125 | 15 | 2 | 600 |
| 73-B. | Neuritis | M | — | — | 25 | 5 | 1 | 1 | 32 |
| | | F | — | — | 12 | 14 | 2 | — | 28 |
| 74-C. | Cerebral Tumour | M | 1 | — | 1 | — | — | — | 2 |
| | | F | — | — | — | — | — | — | 0 |
| 74-D. | Other diseases of the nervous system | M | — | — | — | — | 1 | — | 1 |
| | | F | — | — | 1 | — | — | — | 1 |
| 76-A. | Mastoid disease | M | — | — | — | — | — | — | 0 |
| | | F | — | — | 2 | — | — | — | 2 |
| 76-B. | Other diseases of the ears .. | M | — | — | — | 1 | — | — | 1 |
| | | F | — | — | 1 | — | — | — | 1 |
| III. Diseases of the Circulatory System. | | | | | | | | | 1,724 |
| 77. | Pericarditis | M | — | — | 17 | 2 | 3 | — | 22 |
| | | F | — | — | — | — | — | — | 0 |
| 78-A. | Acute Myocarditis | M | — | — | 43 | 2 | 5 | — | 50 |
| | | F | — | 2 | 23 | 1 | 2 | 1 | 29 |
| 78-B. | Infective Endocarditis .. | M | — | — | 14 | 1 | — | — | 15 |
| | | F | — | — | 2 | — | — | — | 2 |
| 78-C. | Other acute Endocarditis .. | M | — | — | 6 | 1 | 2 | — | 9 |
| | | F | — | — | 5 | — | — | — | 5 |
| 79-A. | Valvular Disease | M | 1 | 1 | 66 | 5 | 7 | — | 80 |
| | | F | 1 | — | 26 | 4 | 2 | — | 33 |
| 79-B. | Fatty Degeneration of Heart . | M | — | — | 1 | — | — | — | 1 |
| | | F | — | — | — | — | — | — | 0 |
| 79-C. | Other organic disease of the heart | M | — | — | 16 | — | 3 | 1 | 20 |
| | | F | — | 1 | 3 | 1 | 1 | — | 6 |
| 81-A. | Aneurism | M | — | 1 | 7 | — | — | — | 8 |
| | | F | 1 | — | — | — | — | — | 1 |
| 81-B. | Arterial Sclerosis | M | 2 | 1 | 21 | — | 2 | — | 26 |
| | | F | — | 1 | 3 | — | — | — | 4 |
| 81-C. | Other diseases of arteries .. | M | — | — | 17 | — | 1 | — | 18 |
| | | F | — | — | 1 | — | — | — | 1 |
| 82-A. | Cerebral Embolism and Thrombosis | M | — | — | 2 | — | — | — | 2 |
| | | F | — | 1 | 2 | — | — | — | 3 |
| 82-B. | Other Embolism and Thrombosis | M | — | — | 1 | — | — | — | 1 |
| | | F | — | — | 1 | — | — | — | 1 |
| 83-A. | Phlebitis | M | — | — | 1 | — | — | — | 1 |
| | | F | — | — | — | — | — | — | 0 |
| 84-A. | Status Lymphaticus | M | — | — | 1 | — | — | — | 1 |
| | | F | — | — | — | — | — | — | 0 |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL |
|---|--|--------|-----------|-----------|------------|----------|-----------|--------|------------|
| 84-B. | Other diseases of the Lymphatic system | M F | — — | — — | 1 — | — — | — — | — — | 1 0 |
| 85-A. | Functional disease of the heart | M F | — — | — — | 1 1 | — — | — 1 | — — | 1 2 |
| 85-C. | Haemorrhage—Other diseases of the Circulatory System | M F | — — | — — | 1 — | — — | 1 — | — — | 2 0 |
| IV. Diseases of the Respiratory System. | | | | | | | | | 345 |
| 87-A. | Laryngismus Stridulus .. | M F | — — | — — | 1 — | — — | — — | — — | 1 0 |
| 87-B. | Laryngitis | M F | — — | — — | 1 1 | — — | — — | — — | 1 1 |
| 88. | Diseases of the Thyroid Body | M F | — — | — — | — 1 | — — | — — | — — | 0 1 |
| 89 & 90-A. | Bronchiectasis, Bronchial Catarrh, &c. | M F | — — | — — | — — | — — | — — | — 1 | 0 1 |
| 89 & 90-B. | Other Bronchitis .. | M F | — — | 2 2 | 74 62 | 13 13 | 4 3 | 1 — | 94 80 |
| 91. | Broncho Pneumonia .. | M F | 3 — | 4 5 | 398 327 | 31 29 | 42 12 | 4 1 | 482 374 |
| 92-A. | Lobar Pneumonia | M F | 2 1 | 3 2 | 375 63 | 39 19 | 154 19 | 1 1 | 574 105 |
| 92-B. | Pneumonia (type not stated) .. | M F | — — | 1 — | 428 163 | 60 48 | 40 12 | 4 — | 533 223 |
| 93-A. | Empyema | M F | — — | — — | 13 1 | 3 — | 3 — | — — | 19 1 |
| 93-B. | Other Pleurisy | M F | — — | — — | 3 — | — — | 2 — | — — | 5 0 |
| 94-B. | Pulmonary Oedema and Congestion | M F | — — | 1 — | 2 — | — — | — — | — — | 3 0 |
| 94-C. | Hypostatic Pneumonia .. | M F | — — | 1 — | 14 2 | — — | 1 — | — — | 16 2 |
| 95. | Gangrene of the Lung .. | M F | — — | — — | 4 — | 1 — | 2 — | — — | 7 0 |
| 96. | Asthma | M F | — — | — — | 33 10 | 5 1 | 2 — | — — | 40 11 |
| 97. | Pulmonary Emphysema .. | M F | — — | — — | 1 — | — — | — — | — — | 1 0 |
| 98-A. | Fibroid disease of Lung .. | M F | — — | — — | — 1 | — — | — — | — — | 0 1 |
| 98-B. | Other diseases of the respiratory system | M F | — — | — — | 4 — | 1 — | 3 — | — — | 8 0 |
| V. Diseases of the Digestive System. | | | | | | | | | 2,584 |
| 102. | Perforating Ulcer of Stomach | M F | — 1 | — — | 20 3 | 2 2 | 2 — | — — | 24 6 |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|----------------|--|----------|-----------|-----------|------------|----------|---------|--------|------------|-----|
| 103-A. | Inflammation of Stomach .. | { M F | — — | — — | 23 13 | 15 16 | 1 6 | — — | 39 35 | 74 |
| 103-B. | Other diseases of the Stomach | { M F | — — | — — | 2 1 | — 1 | 1 — | — — | 3 2 | 5 |
| 104-A & 105-A. | Infective Enteritis .. | { M F | — — | — 1 | 164 116 | 2 2 | 5 2 | — — | 171 121 | 292 |
| 104-B & 105-B. | Diarrhoea (not re- turned as infective) .. | { M F | — — | — — | 87 69 | 4 3 | 4 2 | 1 — | 96 74 | 170 |
| 104-C & 105-G. | Enteritis (not re- turned as infective) .. | { M F | — — | 1 — | 68 46 | 14 8 | 3 4 | — — | 86 58 | 144 |
| 104-D & 105-D. | Gastro-Enteritis .. | { M F | 1 — | 2 — | 52 39 | 15 14 | 3 1 | 2 1 | 75 55 | 130 |
| 104-E & 105-E. | Dyspepsia .. | { M F | — — | — — | 4 4 | — — | — — | — — | 4 4 | 8 |
| 104-F & 105-F. | Colic .. | { M F | — — | — — | — — | — — | 1 — | — — | 1 0 | 1 |
| 104-H & 105-H. | Duodenal Ulcer .. | { M F | 1 — | — — | 1 1 | — — | — — | — — | 2 1 | 3 |
| 106. | Ankylostomiasis .. | { M F | — — | 1 — | 10 2 | — — | 6 5 | — — | 17 7 | 24 |
| 107. | Other Intestinal Parasites .. | { M F | — — | — — | 3 1 | — — | 1 1 | — — | 4 2 | 6 |
| 108. | Appendicitis .. | { M F | — — | — 1 | 16 1 | 1 — | — 1 | 1 1 | 18 4 | 22 |
| 109-A. | Hernia .. | { M F | — — | — — | 6 — | — — | 1 — | 1 — | 8 0 | 8 |
| 109-B. | Intestinal Obstruction .. | { M F | — — | — — | 8 1 | 1 1 | — — | — — | 9 2 | 11 |
| 110. | Other diseases of the intestines | { M F | — — | — 1 | 1 1 | — 1 | 1 — | — — | 2 3 | 5 |
| 113-A. | Cirrhosis of Liver (not re- turned as alcoholic) .. | { M F | — — | — 1 | 58 13 | 3 — | 5 1 | 1 — | 67 15 | 82 |
| 113-C. | Diseases formerly classed to "Other diseases of Liver and gall bladder" .. | { M F | — — | — — | — — | — — | 1 — | — — | 1 0 | 1 |
| 114. | Biliary Calculi .. | { M F | — — | — — | — — | — 1 | — — | — — | 0 1 | 1 |
| 115. | Other diseases of the Liver .. | { M F | 1 — | 1 — | 30 1 | 1 — | 5 1 | — — | 38 2 | 40 |
| 116-B. | Other diseases of the Spleen .. | { M F | — — | — — | 13 1 | 1 — | 1 — | — — | 15 1 | 16 |
| 117. | Peritonitis (cause unstated) .. | { M F | 2 — | — — | 23 5 | — — | 2 — | — — | 27 5 | 32 |
| 118-A. | Abdominal Abscess, Subphre- nic Abscess .. | { M F | — — | — — | — — | 1 — | 1 — | — — | 2 0 | 2 |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|---|---|--------|-----------|-----------|-----------|---------|---------|--------|------------|-------|
| 118-B. | Other diseases included under 118 | M F | 1 — | 1 — | 1 — | — — | 2 — | — — | 5 0 | 5 |
| VI. Non-Venereal Disease of the Genito-Urinary System and Annexa. | | | | | | | | | | 1,112 |
| 119. | Acute Nephritis | M F | — — | 1 — | 28 16 | 3 1 | 2 2 | 1 — | 35 19 | 54 |
| 120-A. | Bright's Disease | M F | — — | 1 3 | 243 88 | 3 10 | 21 5 | 2 3 | 270 109 | 379 |
| 120-B. | Nephritis | M F | — — | — 1 | 97 51 | 12 9 | 6 3 | 1 1 | 116 65 | 181 |
| 122-C. | Suppression of Urine .. | M F | — — | — — | 1 — | — — | — — | — — | 1 0 | 1 |
| 122-D. | Other diseases of the kidney and annexa | M F | — — | — 1 | 7 — | — — | 1 — | 1 — | 9 1 | 10 |
| 123. | Calculi of the Urinary Passages | M F | — — | — — | 1 — | — — | — — | — — | 1 0 | 1 |
| 124. | Diseases of the Bladder .. | M F | — 1 | 1 — | 5 1 | 1 — | 1 — | — — | 8 2 | 10 |
| 125-B. | Other diseases of urethra, etc. | M F | — — | — — | 1 — | 1 — | — — | — — | 2 0 | 2 |
| 127. | Non-Venereal diseases of male genital organs .. | M F | — — | — — | — — | 1 — | 1 — | — — | 2 0 | 2 |
| 128-B. | Other uterine haemorrhage .. | F | — | — | 1 | — | — | — | 1 | 1 |
| 129. | Uterine Tumour (non cancerous) | F | — | — | 1 | — | — | — | 1 | 1 |
| 130-B. | Other diseases of the Uterus .. | F | — | — | 1 | — | — | — | 1 | 1 |
| 131. | Ovarian Cyst, Tumour .. | F | — | — | 1 | — | — | — | 1 | 1 |
| 132-B. | Other diseases of the female genital organs | F | — | — | 1 | 1 | 1 | — | 3 | 3 |
| VII. The Puerperal State. | | | | | | | | | | 647 |
| 134-A. | Abortion | F | — | — | 1 | — | — | — | 1 | 1 |
| 134-B. | Haemorrhage of Pregnancy .. | F | — | — | 1 | 1 | — | — | 2 | 2 |
| 134-C. | Uncontrollable Vomiting .. | F | — | — | 1 | — | 2 | 1 | 4 | 4 |
| 134-D. | Ectopic Gestation | F | — | — | 1 | — | — | — | 1 | 1 |
| 134-E. | Other accidents of Pregnancy | F | — | — | 3 | — | — | — | 3 | 3 |
| 135. | Puerperal Haemorrhage .. | F | — | — | 16 | 5 | 2 | — | 23 | 23 |
| 136. | Other Accidents of Child Birth | F | 1 | — | 6 | 8 | 5 | — | 20 | 20 |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|---|--|-----|-----------|-----------|---------|--------|---------|--------|-------|----|
| 137. | Puerperal Fever | F | — | 2 | 11 | 1 | 5 | — | 19 | 19 |
| 138-A. | Puerperal Nephritis and Uraemia | F | — | — | 1 | — | — | — | 1 | 1 |
| 138-B. | Puerperal Albuminuria and Bright's Disease | F | — | — | — | — | 1 | — | 1 | 1 |
| 138-C. | Puerperal Convulsions | F | — | — | 11 | 1 | 1 | — | 13 | 13 |
| 139-A. | Puerperal Phlegmasia alba dolens and phlebitis | F | — | — | 2 | — | — | — | 2 | 2 |
| 139-B. | Puerperal Embolism and sudden death | F | — | — | 1 | — | — | — | 1 | 1 |
| VIII. Diseases of The Skin and of The Cellular Tissue. | | | | | | | | | | 91 |
| 142-A. | Senile Gangrene | M | — | — | 4 | — | — | — | 4 | 4 |
| | | F | — | — | — | — | — | — | 0 | |
| 142-B. | Noma, Gangrene of Mouth | M | — | — | 5 | — | — | — | 5 | 10 |
| | | F | — | — | 4 | — | 1 | — | 5 | |
| 142-C. | Noma Pudendi | M | — | — | 2 | — | 2 | — | 4 | 4 |
| | | F | — | — | — | — | — | — | 0 | |
| 142-D. | Other Gangrene | M | — | — | 7 | — | 2 | — | 9 | 9 |
| | | F | — | — | — | — | — | — | 0 | |
| 143. | Carbuncle, Boil | M | — | — | 5 | — | — | — | 5 | 13 |
| | | F | — | — | 8 | — | — | — | 8 | |
| 144-A. | Phlegmon | M | 1 | — | 10 | — | 2 | — | 13 | 15 |
| | | F | — | — | 1 | — | — | 1 | 2 | |
| 144-B. | Acute Abscess | M | — | — | 5 | — | — | — | 5 | 10 |
| | | F | — | — | 4 | 1 | — | — | 5 | |
| 145-A. | Ulcer, Bedsore | M | — | — | 17 | — | — | — | 17 | 17 |
| | | F | — | — | — | — | — | — | 0 | |
| 145-C. | Pemphigus | M | — | — | — | — | — | — | 0 | 1 |
| | | F | — | — | 1 | — | — | — | 1 | |
| 145-D. | Other diseases of Integumentary system | M | — | — | — | — | 1 | — | 1 | 1 |
| | | F | — | — | — | — | — | — | 0 | |
| IX. Diseases of the Bones and of the Organs of Locomotion. | | | | | | | | | | 84 |
| 146. | Diseases of the Bones | M | — | — | 3 | — | — | — | 3 | 5 |
| | | F | — | — | 2 | — | — | — | 2 | |
| 147. | Diseases of the Joints | M | — | — | 1 | — | — | — | 1 | 1 |
| | | F | — | — | — | — | — | — | 0 | |
| X. Malformations. | | | | | | | | | | 6 |
| 150-A. | Congenital Hydrocephalus | M | — | — | 1 | — | — | — | 1 | 2 |
| | | F | — | — | — | — | 1 | — | 1 | |
| 150-C. | Congenital Malformation of Heart | M | — | — | 8 | — | — | — | 8 | 10 |
| | | F | — | — | 2 | — | — | — | 2 | |

| DISEASE. | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|---|--|--------|-----------|-----------|------------|----------|----------|--------|------------|-----|
| 150-D. | Other congenital malformations | M F | — — | — — | 4 9 | — — | — — | — — | 4 9 | 13 |
| | | | | | | | | | | 25 |
| XI. Diseases of Early Infancy. | | | | | | | | | | |
| 151-A. | Premature Birth | M F | 2 — | 3 2 | 129 148 | 27 23 | 17 16 | 1 — | 179 189 | 368 |
| 151-B. | Infantile atrophy, debility and marasmus | M F | — — | 1 — | 58 62 | 20 16 | 9 6 | — — | 88 84 | 172 |
| 151-C. | Icterus Neonatorum | M F | — — | — — | 4 1 | 1 — | — — | — — | 5 1 | 6 |
| 152-B. | Atelectasis | M F | — — | — 1 | 7 10 | 2 — | — — | — — | 9 11 | 20 |
| 152-C. | Injuries at Birth | M F | — — | — — | 2 2 | — — | — — | — — | 2 2 | 4 |
| | | | | | | | | | | 570 |
| XII. Old Age. | | | | | | | | | | |
| 154-B. | Senile Decay | M F | 1 1 | 1 2 | 208 175 | 38 67 | 10 12 | 1 — | 259 257 | 516 |
| | | | | | | | | | | 516 |
| XIII. Affections Produced by External Causes. | | | | | | | | | | |
| 157. | Suicide by Hanging | M F | — — | — — | 27 4 | — — | 2 — | — — | 29 4 | 33 |
| 159. | Suicide by Firearms | M F | 3 — | — — | — — | — — | — — | — — | 3 0 | 3 |
| 160. | Suicide by cutting or piercing instruments | M F | — — | — — | 2 1 | — — | — — | — — | 2 1 | 3 |
| 165. | Other acute poisonings | M F | — — | — — | 5 1 | — — | — — | — 1 | 5 2 | 7 |
| 167. | Burns | M F | — — | — — | 6 1 | 1 — | 4 — | — — | 11 1 | 12 |
| 168. | Absorptions of deleterious gases | M F | — — | — — | 1 1 | — — | — — | — — | 1 1 | 2 |
| 169. | Accidental Drowning | M F | — — | — — | 38 4 | 1 — | 2 — | — — | 41 4 | 45 |
| 170. | Injury by Firearms | M F | — — | — — | 1 1 | — — | — — | — — | 1 1 | 2 |
| 172. | Injury by Fall | M F | 1 — | 1 — | 9 1 | — — | 2 — | 1 — | 14 1 | 15 |
| 175. | Injury by other Crushing | M F | — — | — — | 17 6 | 3 — | 6 — | 1 — | 27 6 | 33 |
| 177. | Starvation | M F | — — | — — | 7 1 | — — | 1 1 | — — | 8 2 | 10 |
| 181. | Electricity | M F | — — | — — | 1 1 | — — | 1 — | — — | 2 1 | 3 |
| 182. | Homicide by Firearms | M F | — — | — — | 40 1 | — — | — — | — — | 40 1 | 41 |

| DISEASE. | | | Sex | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL | |
|---|----|----|----------|-----------|-----------|------------|----------|---------|--------|------------|----------|
| Homicide by cutting or piercing instruments | .. | .. | { M F | — — | — — | 37 3 | 1 — | 4 — | — — | 42 3 | } 45 |
| Fractures | .. | .. | { M F | — — | — — | 50 4 | 2 — | 10 — | 1 — | 63 4 | |
| Other Violence | .. | .. | { M F | — — | — — | 23 4 | 2 — | 4 — | — — | 29 4 | } 33 |
| | | | | | | | | | | | |
| XIV. Ill-Defined Causes. | | | | | | | | | | | 354 |
| Dropsy | .. | .. | { M F | — — | — — | 33 24 | 2 1 | — 1 | — — | 35 26 | } 61 |
| A. Heart Failure | .. | .. | { M F | — — | — 2 | 1 2 | — 1 | 1 — | — — | 2 5 | |
| B. Atrophy debility, marasmus | .. | .. | { M F | — — | — — | 30 23 | 8 15 | 9 4 | — — | 47 42 | } 89 |
| D. Pyrexia | .. | .. | { M F | — — | 2 1 | 207 128 | 32 17 | 12 8 | — — | 253 154 | |
| E. Other Ill-defined Deaths | .. | .. | { M F | — — | — — | 33 11 | 2 — | 2 — | — — | 37 11 | } 48 |
| F. Cause not Specified | .. | .. | { M F | — — | — — | 14 8 | 1 — | 1 1 | — — | 16 9 | |
| | | | | | | | | | | | |
| Total Males | .. | .. | | 45 | 51 | 8,113 | 846 | 797 | 55 | 9,907 | } 14,165 |
| Total Females | .. | .. | | 11 | 56 | 3,270 | 655 | 235 | 31 | 4,258 | |
| Grand Totals | .. | .. | | 56 | 107 | 11,383 | 1,501 | 1,032 | 86 | 14,165 | |

The death rates for the different nationalities were:—

| | 1927 | | | 1926 | | |
|--------------|--------|----------|--------|--------|----------|--------|
| | Males. | Females. | Total. | Males. | Females. | Total. |
| Europeans .. | 13.73 | 6.84 | 11.47 | 14.26 | 8.93 | 12.33 |
| Eurasians .. | 20.86 | 20.33 | 20.58 | 23.21 | 18.04 | 20.54 |
| Chinese .. | 36.58 | 28.12 | 33.67 | 36.07 | 86.98 | 32.94 |
| Malays .. | 41.85 | 37.66 | 39.91 | 31.05 | 31.99 | 31.46 |
| Indians .. | 27.11 | 40.96 | 29.37 | 27.22 | 50.82 | 30.75 |
| Others .. | 13.36 | 9.81 | 11.82 | 19.67 | 22.40 | 20.61 |
| Total .. | 35.22 | 28.98 | 33.08 | 34.21 | 27.86 | 32.04 |

The following return gives the death rates per 1000 of each nationality from each group of diseases:—

| | Europeans. | Eurasians. | Chinese | Malays. | Indians. | Others. |
|-----------------------------------|------------|------------|---------|---------|----------|---------|
| General Diseases | 4.0 | 5.5 | 13.5 | 12.2 | 9.9 | 4.9 |
| Diseases of nervous system .. | 1.4 | 2.5 | 3.8 | 8.2 | 1.9 | 1.3 |
| Diseases of Circulatory System .. | 1.0 | 1.5 | 0.8 | 0.4 | 0.8 | 0.2 |
| „ „ Respiratory System .. | 1.2 | 4.0 | 5.8 | 6.9 | 8.5 | 1.7 |
| „ „ Digestive System .. | 1.4 | 1.9 | 2.6 | 2.8 | 1.9 | 1.1 |
| „ „ Genito Urinary System | 0.2 | 1.5 | 1.6 | 1.1 | 1.2 | 1.2 |
| „ „ Early Infancy | 0.4 | 1.3 | 1.2 | 2.3 | 1.3 | 0.1 |
| Ill defined causes | — | 0.9 | 1.5 | 2.1 | 1.1 | — |

(19-D)

Mortality in relation to age and sex. The following return shows the number of deaths from each cause in the different age periods for each sex:—

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL | |
|----------------------|----------------------------------|-------------|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|--------------|---------|
| I. General Diseases. | | | | | | | | | | | | | | | | |
| 1. | Enteric Fever | .. { M F | — — | — — | — — | 3 3 | 3 6 | 17 1 | 36 3 | 49 8 | 20 5 | 6 2 | 1 — | — — | 135 28 | } 163 |
| 2. | Malaria | .. { M F | 3 — | 6 6 | 12 7 | 29 25 | 22 20 | 66 21 | 192 30 | 339 52 | 223 33 | 116 22 | 48 14 | 1 — | 1,057 230 | |
| 3. | Small Pox | .. { M F | — 1 | — — | 1 — | — — | — — | — 1 | — — | 1 1 | — 2 | — — | — — | — — | 2 5 | } 7 |
| 4. | Measles | .. { M F | — — | 1 — | 2 1 | — 2 | — — | — — | 2 — | — — | — — | — — | — — | — — | 5 3 | |
| 5. | Whooping Cough | .. { M F | — — | — 1 | — 1 | — — | — — | — — | — — | — — | — — | — — | — — | — — | 0 2 | } 2 |
| 6-A. | Diphtheria | .. { M F | — — | — — | 3 1 | 1 1 | 1 1 | — — | — — | — — | 1 — | — — | — — | — — | 6 3 | |
| 7. | Influenza | .. { M F | 1 4 | 5 6 | 5 7 | 1 3 | 1 1 | 5 2 | 6 3 | 6 4 | 4 6 | 8 7 | 20 13 | — — | 62 56 | } 118 |
| 8. | Cholera .. | .. { M F | — — | — — | — — | — — | — — | — — | — — | 5 — | 4 — | 4 — | 1 — | — — | 14 0 | |
| 9. | Dysentery | .. { M F | — — | 1 1 | 10 7 | 2 9 | 6 2 | 18 3 | 40 9 | 147 25 | 148 20 | 138 23 | 66 24 | — — | 576 123 | } 699 |
| 10. | Plague .. | .. { M F | — — | — — | 1 — | — — | — — | — — | 1 — | 1 — | — — | — — | — — | — — | 3 0 | |
| 11. | Leprosy .. | .. { M F | — — | — — | — — | — — | — 1 | 1 1 | 1 3 | 3 1 | 6 — | 2 1 | 4 1 | — — | 17 8 | } 25 |
| 12. | Erysipelas | .. { M F | — — | — — | — — | — — | — — | — — | — — | 1 — | 1 — | — — | — — | — — | 2 0 | |
| 13-D. | Other diseases included under 19 | .. { M F | — — | — — | — — | — — | — — | — — | — — | 1 — | — — | — — | — — | — — | 1 0 | } 1 |
| 14-A. | Pyaemia .. | .. { M F | — 2 | 1 1 | — 1 | — — | — — | 1 — | — 1 | 2 — | — — | — — | 1 — | — — | 5 5 | |
| 15-B. | Septicaemia | .. { M F | 1 2 | — 3 | 2 3 | — — | — — | 1 1 | 4 — | 15 1 | 10 2 | 8 — | 2 — | 1 — | 44 12 | } 56 |
| 16. | Tetanus .. | .. { M F | 36 28 | — 1 | 2 1 | — — | 2 1 | 1 — | — — | 5 — | 3 — | — — | 1 — | — — | 50 31 | |
| 17. | Beri Beri .. | .. { M F | — — | — — | — — | 1 2 | 6 1 | 39 12 | 118 19 | 346 58 | 219 45 | 130 28 | 45 8 | 1 — | 905 173 | } 1,078 |
| 18-A. | Pulmonary Tuberculosis | .. { M F | — — | — — | 4 2 | 2 3 | — 2 | 8 3 | 44 13 | 161 24 | 182 15 | 142 14 | 54 11 | 5 — | 602 87 | |
| 18-B. | Phthisis .. | .. { M F | — — | — — | 6 1 | 4 — | 1 1 | 10 9 | 27 23 | 106 51 | 169 53 | 147 42 | 68 29 | — — | 538 209 | } 747 |
| 19-B. | Miliary Tuberculosis | .. { M F | — — | 1 — | 2 — | 1 — | 1 — | — — | 2 — | 5 — | 2 — | 1 — | 2 — | — — | 17 0 | |
| 20. | Tuberculous Meningitis | .. { M F | 1 1 | 1 1 | 2 2 | 3 2 | 1 2 | — 1 | 2 — | 1 2 | — — | 2 — | — — | — — | 13 11 | } 24 |
| 21-A. | Tabes Mesenterica | .. { M F | — — | 1 1 | — — | — 1 | — 1 | — 1 | 1 — | — 1 | — 2 | — — | — — | — — | 2 7 | |

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL |
|----------|--|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|-------|
| 31-B. | Other peritoneal and intestinal tubercle | M | — | — | 1 | — | 1 | 1 | — | 2 | 1 | — | — | — | 6 |
| | | F | — | — | — | — | — | 1 | — | — | — | — | — | — | 1 |
| 32. | Tuberculosis of Spinal Column .. | M | — | — | 1 | — | — | — | — | 3 | 2 | 1 | — | — | 7 |
| | | F | — | — | 1 | — | 2 | — | — | 1 | — | — | — | — | 4 |
| 33. | Tuberculosis of Joints | M | — | 1 | — | 2 | — | — | — | — | 1 | — | — | — | 4 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 34-C. | Other Tuberculosis included under 34 | M | — | — | 2 | — | — | — | — | — | 1 | 1 | — | — | 4 |
| | | F | — | — | — | 1 | 1 | — | — | — | — | — | — | — | 2 |
| 35. | Disseminated Tuberculosis | M | — | 1 | 2 | 1 | — | — | — | 2 | 2 | — | — | — | 8 |
| | | F | — | — | — | 1 | — | — | — | — | — | — | — | — | 1 |
| 36-A. | Rickets | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | F | — | 1 | — | — | — | — | — | — | — | — | — | — | 1 |
| 37. | Syphilis | M | 15 | 8 | 4 | 1 | — | 1 | 3 | 12 | 25 | 27 | 7 | 5 | 108 |
| | | F | 16 | 2 | 1 | 1 | — | — | 3 | 5 | 2 | 2 | 1 | — | 33 |
| 38-A. | Soft Chancre .. | M | — | — | — | — | — | — | 1 | — | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 38-B. | Gonococcus Infection | M | 1 | — | — | — | — | — | — | 1 | 3 | — | — | — | 5 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 39. | Cancer of the Buccal Cavity | M | — | — | — | — | — | — | — | 1 | 2 | 1 | 2 | — | 6 |
| | | F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| 40. | Cancer of the Stomach, Liver, &c. .. | M | — | — | — | — | — | — | 1 | 9 | 17 | 33 | 15 | — | 75 |
| | | F | — | — | — | 1 | — | — | — | 1 | 2 | 10 | 6 | — | 20 |
| 41. | Cancer of the Peritoneum, Intestines and Rectum .. | M | — | — | — | — | — | — | — | 1 | 2 | 3 | — | — | 6 |
| | | F | — | — | — | — | — | — | — | — | 1 | 1 | 2 | — | 4 |
| 42. | Cancer of the female genital organs .. | F | — | — | — | — | — | — | — | 2 | 1 | 6 | 3 | — | 12 |
| 43. | Cancer of the Breast | F | — | — | — | — | — | — | — | 2 | 2 | 2 | 1 | — | 7 |
| 44. | Cancer of the skin .. | M | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 45. | Cancer of other or unspecified organs | M | — | — | — | 1 | — | — | 2 | 5 | 5 | 4 | 2 | — | 19 |
| | | F | — | — | — | — | — | — | — | 1 | 1 | 2 | 1 | — | 5 |
| 46-C. | Other Tumours .. | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| 47. | Rheumatic Fever .. | M | — | — | — | — | — | — | — | 1 | 1 | 1 | 1 | — | 4 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 48-A. | Chronic Rheumatism | M | — | — | — | — | — | — | — | 1 | — | — | 1 | — | 2 |
| | | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 48-B. | Osteo arthritis .. | M | — | — | — | — | — | — | 1 | — | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 49. | Scurvy | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | F | — | — | — | — | — | — | 1 | — | — | — | — | — | 1 |
| 50. | Diabetes | M | — | — | — | — | — | — | — | — | 1 | 3 | 2 | — | 6 |
| | | F | — | — | 1 | — | — | — | 1 | — | 3 | 1 | 3 | — | 9 |

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL | |
|---|---|----------|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|----------|----|
| A. | Leucocythaemia .. | { M F | — — | — — | — — | — — | — — | — — | — — | 1 — | — — | — — | — — | — — | 1 0 | 1 |
| | Anaemia .. | { M F | — — | — 1 | — — | — 1 | — 1 | 2 1 | 2 1 | 6 2 | 3 1 | 3 1 | 3 — | — — | 19 9 | 28 |
| D. | Other diseases in- cluded under 55 .. | { M F | 2 1 | 7 2 | 5 2 | 1 — | — — | — — | — — | — 1 | — 1 | — — | — — | — — | 15 7 | 22 |
| | Alcoholism .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | 1 — | 2 — | — — | — — | 3 0 | 3 |
| | Other Chronic Poi- sonings .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | — — | — — | 1 — | — — | 1 0 | 1 |
| | | | | | | | | | | | | | | | 5,470 | |
| II. Diseases of the Nervous System and of the Organs of Special Sense. | | | | | | | | | | | | | | | | |
| | Encephalitis .. | { M F | — — | — — | — — | — — | — — | — — | — — | 1 — | 1 — | 1 — | 1 — | — — | 4 0 | 4 |
| A. | Cerebro Spinal Fever | { M F | 1 — | 1 — | — — | — — | — — | 1 — | 1 — | 5 — | 2 — | 1 — | — — | — — | 12 0 | 12 |
| B. | Posterior basal Men- ingitis .. | { M F | — — | 1 — | — — | — — | — — | — — | — — | 1 — | — — | — — | — — | — — | 2 0 | 2 |
| C. | Meningitis—Other forms .. | { M F | — — | — 1 | 5 1 | — 2 | 1 — | 1 — | 1 — | 3 1 | 3 — | 3 1 | — — | — — | 17 6 | 23 |
| | Locomotor Ataxy .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | 1 — | — — | 1 — | — — | 2 0 | 2 |
| A. | Diseases formerly classed to "Other Nervous Affec- tions" .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | — — | 1 — | — — | — — | 0 1 | 1 |
| B. | Other diseases in- cluded under 63 .. | { M F | — 1 | — — | — — | — — | — — | — — | 1 — | — — | 1 — | — — | — — | — — | 2 1 | 3 |
| A. | Apoplexy .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | 2 — | 2 3 | 7 5 | — — | 11 8 | 19 |
| E. | Cerebral Haemorrh- age .. | { M F | — — | — — | — 1 | — — | — — | — — | 2 — | — 1 | 15 3 | 18 6 | 13 10 | — — | 48 21 | 69 |
| | Softening of Brain.. | { M F | — — | — — | — — | — — | — — | — — | — — | 3 — | 1 — | 2 — | 2 — | — — | 8 0 | 8 |
| A. | Hemiplegia .. | { M F | — — | — — | — — | — — | — — | — — | — 1 | 5 3 | 4 1 | 7 1 | 7 4 | — — | 23 10 | 33 |
| B. | Paraplegia .. | { M F | — — | — — | — — | — — | — — | — — | 1 — | 3 1 | 2 1 | 7 1 | 1 — | — — | 14 3 | 17 |
| C. | Other forms of Para- lysis .. | { M F | — — | — — | — — | — — | — — | — — | — — | — — | 1 — | — 1 | 1 1 | — — | 2 2 | 4 |
| | General Paralysis of the Insane .. | { M F | — — | — — | — — | — — | — — | — — | — — | 4 — | 8 — | 2 — | — — | — — | 14 0 | 14 |
| | Other forms of men- tal Alienation .. | { M F | — — | — — | — — | — — | — — | — — | — 1 | — — | 1 — | — — | — — | — — | 2 1 | 3 |

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL |
|---|---|-----|----------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|------------|
| 69. Epilepsy { | M | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 2 |
| 70-B. Other diseases includ- ed under 70 { | M | F | — | — | — | 15 12 | 1 — | — 2 | — 2 | — 2 | — — | — — | — — | — — | 16 18 |
| 71-B. Other Infantile Con- vulsions { | M | F | 352 242 | 317 229 | 134 126 | 2 3 | — — | — — | — — | — — | — — | — — | — — | — — | 805 600 |
| 73-B. Neuritis { | M | F | — | — | — | — | — | — 3 | 4 3 | 5 8 | 4 7 | 11 4 | 8 3 | — | 32 28 |
| 74-C. Cerebral Tumour .. { | M | F | — | — | — | — | — | — | — | 2 — | — — | — — | — — | — — | 2 0 |
| 74-D. Other diseases of the nervous system .. { | M | F | — | — | — | — | — | — | — | — 1 | 1 — | — — | — — | — — | 1 1 |
| 76-A. Mastoid Disease .. { | M | F | — | — | — 1 | — | — | — | — | — 1 | — — | — — | — — | — — | 0 2 |
| 76-B. Other diseases of the ears { | M | F | — | — 1 | — | — | — | — | 1 — | — — | — — | — — | — — | — — | 1 1 |
| III. Diseases of the Circulatory System. | | | | | | | | | | | | | | | |
| 77. Pericarditis { | M | F | — | — | — | — | — | — | 5 — | 6 — | 5 — | 5 — | 1 — | — | 22 0 |
| 78-A. Acute Myocarditis .. { | M | F | — | 1 — | — | — | 2 — | — | 5 3 | 16 10 | 15 6 | 6 4 | 5 4 | — | 50 29 |
| 78-B. Infective Endo- carditis { | M | F | — | — | — | — | — | 1 2 | — | 3 — | 5 — | 4 — | 2 — | — | 15 2 |
| 78-C. Other acute Endo- carditis { | M | F | — | — | — 1 | — | — | — 1 | 1 1 | 1 1 | 2 — | 5 1 | — — | — — | 9 5 |
| 79-A. Valvular Disease .. { | M | F | — | — | 1 1 | 1 — | — 1 | 2 — | 5 1 | 14 9 | 22 9 | 17 5 | 17 7 | 1 — | 80 33 |
| 79-B. Fatty Degeneration of Heart.. .. . { | M | F | — | — | — | — | — | — | — | — | 1 — | — — | — — | — — | 1 0 |
| 79-C. Other organic disease of the heart .. { | M | F | — 1 | — | — | — | — | — | — | 4 1 | 6 1 | 4 — | 5 3 | — | 20 6 |
| 81-A. Aneurism { | M | F | — | — | — | — | — | — | — | 2 — | 4 — | 2 — | — 1 | — | 8 1 |
| 81-B. Arterial Sclerosis .. { | M | F | — | — | — | — | — | — | — | — | — | 3 2 | 23 2 | — | 26 4 |
| 81-C. Other diseases of ar- teries { | M | F | — | — | — | — | — | — | — 1 | 1 — | 7 — | 7 — | 3 — | — | 18 1 |
| 82-A. Cerebral Embolism & Thrombosis .. { | M | F | — | — | — | — | — | — | — | — | — | 1 — | 1 2 | — | 2 3 |
| 82-B. Other Embolism and Thrombosis .. { | M | F | — | — | — | — | — | — | — | — | 1 — | — — | — 1 | — | 1 1 |
| 83-A. Phlebitis { | M | F | — | — | — | — | — | — | — | — | — | — | — | 1 — | 1 0 |

| DISEASE. | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL |
|--|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|-------|
| Status Lymphaticus | M | — | — | — | — | 1 | — | — | — | — | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Other diseases of the Lymphatic system | M | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Functional disease of the heart .. | M | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | — | 2 | — | — | — | 2 |
| Haemorrhage—Other diseases of the Circulatory System | M | — | — | — | — | — | — | — | 1 | 1 | — | — | — | 2 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | | | | | | | | | | | | | 345 |
| Diseases of the Respiratory System. | | | | | | | | | | | | | | |
| Laryngismus Stridulus | M | — | 1 | — | — | — | — | — | — | — | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Laryngitis .. | M | — | — | 1 | — | — | — | — | — | — | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| Diseases of the Thyroid Body .. | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | F | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 |
| 90-A. Bronchiectasis, Bronchial Catarrh, &c. | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | F | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 |
| 90-B. Other Bronchitis | M | 15 | 39 | 21 | 3 | — | — | 1 | 1 | 1 | 6 | 7 | — | 94 |
| | F | 16 | 33 | 17 | 1 | 4 | — | — | 1 | 1 | 1 | 6 | — | 80 |
| Broncho Pneumonia .. | M | 38 | 149 | 116 | 33 | 8 | 8 | 19 | 40 | 32 | 22 | 17 | — | 482 |
| | F | 55 | 122 | 122 | 37 | 8 | 4 | 4 | 2 | 6 | 8 | 6 | — | 374 |
| Lobar Pneumonia .. | M | 5 | 10 | 8 | 2 | 3 | 13 | 50 | 176 | 154 | 116 | 37 | — | 574 |
| | F | 3 | 10 | 15 | 5 | 5 | 3 | 10 | 22 | 9 | 14 | 9 | — | 105 |
| Pneumonia (type not stated) | M | 20 | 39 | 52 | 28 | 7 | 22 | 54 | 111 | 90 | 72 | 38 | — | 533 |
| | F | 12 | 27 | 47 | 23 | 13 | 6 | 7 | 31 | 19 | 22 | 16 | — | 223 |
| Empyema | M | — | — | 1 | — | — | 1 | 1 | 9 | 2 | 5 | — | — | 19 |
| | F | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| Other Pleurisy .. | M | — | — | — | — | — | 1 | 2 | 1 | — | — | 1 | — | 5 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Pulmonary Oedema & Congestion .. | M | — | 1 | — | — | — | — | — | — | — | 2 | — | — | 3 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Hypostatic Pneumonia | M | — | — | — | — | — | — | 1 | 2 | 6 | 3 | 4 | — | 16 |
| | F | — | — | — | — | — | — | — | — | 1 | 1 | — | — | 2 |
| Gangrene of the Lung | M | — | — | — | — | — | — | — | 2 | 5 | — | — | — | 7 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Asthma | M | — | — | — | — | — | — | 1 | 5 | 12 | 15 | 7 | — | 40 |
| | F | — | — | — | — | — | — | — | — | 3 | 6 | 2 | — | 11 |
| Pulmonary Emphysema | M | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Fibroid disease of Lung | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | F | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 |
| Other diseases of the respiratory system | M | — | — | — | — | — | — | 1 | 3 | 3 | 1 | — | — | 8 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | | | | | | | | | | | | | 2584 |

| DISEASE. | | Sex | Under 3 months | 3-12 months | 1-5 years | 5-10 years | 10-15 years | 15-20 years | 20-25 years | 25-35 years | 35-45 years | 45-55 years | Over 55 years | Unknown | TO |
|---|---|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|-----|
| V. Diseases of the Digestive System. | | | | | | | | | | | | | | | |
| 102. Perforating Ulcer of Stomach .. | { | M | — | — | — | — | — | — | 2 | 5 | 8 | 7 | 2 | — | 24 |
| | | F | — | — | — | — | — | — | 1 | 2 | — | 1 | 2 | — | 6 |
| 103-A. Inflammation of Stomach .. | { | M | 14 | 14 | 3 | — | — | — | — | 1 | 2 | 3 | 2 | — | 39 |
| | | F | 11 | 16 | 2 | — | — | — | — | 1 | 3 | 1 | 1 | — | 35 |
| 103-B. Other diseases of the Stomach .. | { | M | — | — | — | — | — | — | — | 1 | — | — | 2 | — | 3 |
| | | F | — | — | — | — | — | — | — | — | 1 | 1 | — | — | 2 |
| 104-A & 105-A. Infective Enteritis .. | { | M | 39 | 69 | 46 | 5 | — | — | 1 | 6 | 2 | 2 | 1 | — | 171 |
| | | F | 24 | 58 | 37 | 1 | — | — | — | — | 1 | — | — | — | 121 |
| 104-B & 105-B. Diarrhoea (not returned as infective) .. | { | M | 45 | 35 | 14 | — | 1 | — | — | — | 1 | — | — | — | 96 |
| | | F | 30 | 33 | 10 | — | — | — | — | — | — | — | — | 1 | 74 |
| 104-C & 105-C. Enteritis(not returned as infective) .. | { | M | 12 | 33 | 32 | 1 | — | — | 1 | 2 | 1 | — | 4 | — | 86 |
| | | F | 8 | 23 | 17 | 1 | — | — | — | 2 | — | 3 | 4 | — | 58 |
| 104-D & 105-D. Gastro-Enteritis .. | { | M | 28 | 30 | 9 | — | — | — | — | 2 | 2 | — | 4 | — | 75 |
| | | F | 14 | 19 | 13 | 3 | — | 1 | — | — | 2 | 1 | 2 | — | 55 |
| 104-E & 105-E. Dyspepsia .. | { | M | 2 | 1 | — | — | — | — | — | — | — | 1 | — | — | 4 |
| | | F | 3 | 1 | — | — | — | — | — | — | — | — | — | — | 4 |
| 104-F & 105-F. Colic .. | { | M | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 104-H & 105-H. Duodenal Ulcer .. | { | M | — | — | — | — | — | — | — | 1 | 1 | — | — | — | 2 |
| | | F | — | — | — | — | — | — | 1 | — | — | — | — | — | 1 |
| 106. Ankylostcmiasis .. | { | M | — | — | 1 | — | — | — | 1 | 9 | 3 | 3 | — | — | 17 |
| | | F | — | — | 1 | — | — | — | — | 4 | 1 | 1 | — | — | 7 |
| 107. Other Intestinal Parasites .. | { | M | — | 1 | 3 | — | — | — | — | — | — | — | — | — | 4 |
| | | F | — | — | 1 | 1 | — | — | — | — | — | — | — | — | 2 |
| 108. Appendicitis .. | { | M | — | — | — | — | — | 3 | 1 | 4 | 8 | 2 | — | — | 18 |
| | | F | — | — | — | — | — | — | 1 | 2 | — | — | 1 | — | 4 |
| 109-A. Hernia .. | { | M | 1 | — | — | — | — | 1 | — | — | 2 | 3 | 1 | — | 8 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 109-B. Intestinal Obstruction .. | { | M | 1 | 1 | — | — | — | — | — | 2 | 3 | 2 | — | — | 9 |
| | | F | 1 | — | — | — | — | — | — | — | 1 | — | — | — | 2 |
| 110. Other diseases of the intestines .. | { | M | — | — | — | — | — | — | 1 | — | 1 | — | — | — | 2 |
| | | F | — | — | — | — | — | — | — | 1 | 1 | 1 | — | — | 3 |
| 113-A. Cirrhosis of Liver (not returned as alcoholic) .. | { | M | — | — | — | — | — | 1 | 1 | 9 | 24 | 25 | 7 | — | 67 |
| | | F | — | — | — | 1 | — | — | 1 | 5 | 3 | 4 | 1 | — | 15 |
| 113-C. Diseases formerly classed to "Other diseases of Liver and gall bladder" .. | { | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| 114. Biliary Calculi .. | { | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | | F | — | — | — | — | — | — | 1 | — | — | — | — | — | 1 |

| DISEASE. | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL | |
|--|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|-------|-------|
| Other diseases of the Liver | M | 2 | — | 1 | — | — | 1 | 3 | 9 | 11 | 8 | 3 | — | 38 | } 40 |
| | F | — | — | 1 | — | — | — | — | 1 | — | — | — | — | 2 | |
| Other diseases of the Spleen | M | — | — | — | — | — | 2 | 1 | 4 | 8 | — | — | — | 15 | } 16 |
| | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 | |
| Peritonitis (cause un- stated) | M | — | — | — | — | — | 1 | 1 | 5 | 8 | 11 | 1 | — | 27 | } 32 |
| | F | — | — | — | — | — | — | — | 2 | 1 | 2 | — | — | 5 | |
| Abdominal Abscess, Subphrenic Abs- cess | M | — | — | — | — | — | — | — | 2 | — | — | — | — | 2 | } 2 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| Other diseases includ- ed under 118 .. | M | — | — | — | — | — | — | 1 | — | 1 | 2 | 1 | — | 5 | } 5 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| | | | | | | | | | | | | | | 1112 | |
| I. Non-Venereal Diseases of the Ito-Urinary System and Annexa. | | | | | | | | | | | | | | | |
| Acute Nephritis .. | M | 1 | 1 | 5 | 5 | — | 3 | — | 6 | 7 | 2 | 5 | — | 35 | } 54 |
| | F | — | 2 | 3 | 2 | — | 2 | 3 | 5 | 2 | — | — | — | 19 | |
| Bright's Disease .. | M | — | — | — | 2 | 1 | 1 | 10 | 31 | 39 | 94 | 92 | — | 270 | } 379 |
| | F | — | 1 | — | — | 3 | 3 | 9 | 24 | 20 | 24 | 25 | — | 109 | |
| Nephritis | M | — | — | 1 | 3 | 1 | 4 | 7 | 16 | 17 | 29 | 38 | — | 116 | } 181 |
| | F | — | — | 1 | 2 | 1 | — | 6 | 14 | 14 | 16 | 11 | — | 65 | |
| Suppression of Urine | M | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 | } 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| Other diseases of the kidney and annexa | M | — | — | — | — | — | — | — | 2 | 3 | 2 | 2 | — | 9 | } 10 |
| | F | — | — | — | — | — | — | — | — | — | — | 1 | — | 1 | |
| Calculi of the Urinary Passages | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 | } 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| Diseases of the Blad- der | M | — | — | — | — | — | — | — | 2 | 2 | 2 | 2 | — | 8 | } 10 |
| | F | — | — | — | — | — | — | — | 1 | — | — | 1 | — | 2 | |
| Other diseases of Urethra, etc. .. | M | — | — | — | — | — | — | — | — | — | 1 | 1 | — | 2 | } 2 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| Non-venereal diseases of male genital or- gans | M | — | — | — | — | — | — | — | — | 1 | — | 1 | — | 2 | } 2 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 | |
| Other uterine hae- morrhage .. | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 | } 1 |
| | F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 | |
| Uterine Tumour (non cancerous) . | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 | } 1 |
| | | | | | | | | | | | | | | | |
| Other diseases of the Uterus | F | — | — | — | — | — | — | — | — | — | 1 | — | — | 1 | } 1 |
| | | | | | | | | | | | | | | | |
| Ovarian Cyst, Tu- mour | F | — | — | — | — | — | — | — | — | — | 1 | — | — | 1 | } 1 |
| | | | | | | | | | | | | | | | |
| Other diseases of the female genital or- gans | F | — | — | — | — | — | — | 1 | 2 | — | — | — | — | 3 | } 3 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 647 | |

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TO |
|---|--|-------------|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|---------|
| VII. The Puerperal State. | | | | | | | | | | | | | | | |
| 134-A. | Abortion | .. { F | — | — | — | — | — | — | — | — | — | — | — | 1 | 1 |
| 134-B. | Haemorrhage of Pregnancy | .. { F | — | — | — | — | — | — | — | 1 | 1 | — | — | — | 2 |
| 134-C. | Uncontrollable Vomiting | .. { F | — | — | — | — | — | — | 1 | 2 | 1 | — | — | — | 4 |
| 134-D. | Ectopic Gestation | .. { F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 134-E. | Other accidents of Pregnancy | .. { F | — | — | — | — | — | — | — | 3 | — | — | — | — | 3 |
| 135. | Puerperal Haemorrhage | .. { F | — | — | — | — | — | 2 | 2 | 14 | 5 | — | — | — | 23 |
| 136. | Other accidents of Child Birth | .. { F | — | — | — | — | — | 2 | 5 | 7 | 5 | 1 | — | — | 20 |
| 137. | Puerperal Fever | .. { F | — | — | — | — | — | 3 | 6 | 6 | 4 | — | — | — | 19 |
| 138-A. | Puerperal Nephritis and Uraemia | .. { F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| 138-B. | Puerperal Albuminuria and Bright's Disease | .. { F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 138-C. | Puerperal Convulsions | .. { F | — | — | — | — | — | 1 | 3 | 6 | 3 | — | — | — | 13 |
| 139-A. | Puerperal Phlegmasia alba dolens and phlebitis | .. { F | — | — | — | — | — | — | 1 | 1 | — | — | — | — | 2 |
| 139-B. | Puerperal Embolism and sudden death | .. { F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| VIII. Diseases of the Skin and of the Cellular Tissue. | | | | | | | | | | | | | | | |
| 142-A. | Senile Gangrene | .. { M F | — | — | — | — | — | — | — | — | — | — | — | 4 | 4 |
| 142-B. | Noma, Gangrene of Mouth | .. { M F | — | — | 1 2 | 2 1 | — | — | — | — | — | 1 | 1 | — | 5 5 |
| 142-C. | Noma Pudendi | .. { M F | — | — | — | — | — | — | 1 | — | 1 | 1 | 1 | — | 4 0 |
| 142-D. | Other Gangrene | .. { M F | — | — | — | — | — | — | — | 3 | 2 | 3 | 1 | — | 9 0 |
| 143. | Carbuncle, Boil | .. { M F | 1 2 | 1 5 | — 1 | — | — | — | — | 1 | — | 2 | — | — | 5 8 |
| 144-A. | Phlegmon | .. { M F | 1 1 | 1 | — | 1 | — | 1 | 1 | 4 | 3 | 1 | — | — | 13 2 |
| 144-B. | Acute Abscess | .. { M F | — 3 | — 1 | — | — | — | 1 1 | 1 | — | 1 | 2 | — | — | 5 5 |

| DISEASE. | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOTAL |
|--|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|-------|
| Ulcer, Bedsore .. | M | 1 | 1 | — | — | — | 2 | — | 3 | 7 | 1 | 2 | — | 17 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Pemphigus .. | M | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | F | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| Other diseases of Integumentary system .. | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Diseases of the Bones and of the Organs of Locomotion. | | | | | | | | | | | | | | 84 |
| Diseases of the Bones | M | — | — | 1 | — | — | — | — | 1 | — | 1 | — | — | 3 |
| | F | — | — | — | 1 | — | — | — | 1 | — | — | — | — | 2 |
| Diseases of the Joints | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Malformations. | | | | | | | | | | | | | | 6 |
| Congenital Hydrocephalus .. | M | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| | F | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| Congenital Malformation of Heart .. | M | 8 | — | — | — | — | — | — | — | — | — | — | — | 8 |
| | F | 1 | — | — | — | 1 | — | — | — | — | — | — | — | 2 |
| Other congenital malformation .. | M | 4 | — | — | — | — | — | — | — | — | — | — | — | 4 |
| | F | 9 | — | — | — | — | — | — | — | — | — | — | — | 9 |
| Diseases of Early Infancy. | | | | | | | | | | | | | | 25 |
| Premature Birth .. | M | 178 | — | — | — | — | — | — | — | — | — | — | 1 | 179 |
| | F | 189 | — | — | — | — | — | — | — | — | — | — | — | 189 |
| Infantile atrophy, debility and marasmus .. | M | 68 | 20 | — | — | — | — | — | — | — | — | — | — | 88 |
| | F | 56 | 27 | 1 | — | — | — | — | — | — | — | — | — | 84 |
| Icterus Neonatorum | M | 5 | — | — | — | — | — | — | — | — | — | — | — | 5 |
| | F | 1 | — | — | — | — | — | — | — | — | — | — | — | 1 |
| Atelectasis .. | M | 9 | — | — | — | — | — | — | — | — | — | — | — | 9 |
| | F | 11 | — | — | — | — | — | — | — | — | — | — | — | 11 |
| Injuries at Birth .. | M | 2 | — | — | — | — | — | — | — | — | — | — | — | 2 |
| | F | 1 | 1 | — | — | — | — | — | — | — | — | — | — | 2 |
| XII. Old Age. | | | | | | | | | | | | | | 570 |
| Senile Decay .. | M | — | — | — | — | — | — | — | — | — | — | 259 | — | 259 |
| | F | — | — | — | — | — | — | — | — | — | — | 257 | — | 257 |
| XIII. Affections induced by External Causes. | | | | | | | | | | | | | | |
| Suicide by Hanging | M | — | — | — | — | — | — | 4 | 8 | 10 | 2 | 2 | 3 | 29 |
| | F | — | — | — | — | — | — | — | 2 | 1 | 1 | — | — | 4 |
| Suicide by Firearms | M | — | — | — | — | — | — | — | 1 | 2 | — | — | — | 3 |
| | F | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Suicide by cutting or piercing instruments .. | M | — | — | — | — | — | — | — | 1 | 1 | — | — | — | 2 |
| | F | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |

| DISEASE. | | Sex | Under 3 months | 3—12 months | 1—5 years | 5—10 years | 10—15 years | 15—20 years | 20—25 years | 25—35 years | 35—45 years | 45—55 years | Over 55 years | Unknown | TOT |
|--------------------------|---|-----|----------------|-------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------|--------|
| 165. | Other acute poisonings | M | — | — | — | — | — | 1 | 2 | 1 | — | 1 | — | — | 5 |
| | | F | — | — | — | — | — | — | 1 | — | — | 1 | — | — | 2 |
| 167. | Burns | M | — | — | 3 | 1 | 1 | — | 1 | 4 | — | — | 1 | — | 11 |
| | | F | — | — | 1 | — | — | — | — | — | — | — | — | — | 1 |
| 168. | Absorptions of deleterious gases .. | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | — | 1 | — | — | 1 |
| 169. | Accidental Drowning | M | — | — | 1 | 1 | 2 | — | 5 | 13 | 4 | 4 | 1 | 10 | 41 |
| | | F | — | — | — | 1 | 1 | — | — | — | 1 | 1 | — | — | 4 |
| 170. | Injury by Firearms | M | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| | | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 172. | Injury by Fall .. | M | — | — | — | — | — | 3 | 1 | 4 | 3 | 3 | — | — | 14 |
| | | F | — | — | 1 | — | — | — | — | — | — | — | — | — | 1 |
| 175. | Injury by other Cru- shing | M | — | — | 1 | 3 | 2 | 2 | 4 | 6 | 2 | 5 | 2 | — | 27 |
| | | F | — | — | 1 | 1 | — | — | 1 | — | — | 1 | 2 | — | 6 |
| 177. | Starvation .. | M | — | — | — | — | — | — | — | 1 | — | 3 | 3 | 1 | 8 |
| | | F | — | — | — | — | — | — | — | — | — | 2 | — | — | 2 |
| 181. | Electricity .. | M | — | — | — | — | — | — | 1 | — | 1 | — | — | — | 2 |
| | | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 182. | Homicide by Fire- arms | M | — | — | — | — | — | 2 | 11 | 14 | 5 | 2 | 1 | 5 | 40 |
| | | F | — | — | — | — | — | — | — | — | 1 | — | — | — | 1 |
| 183. | Homicide by cutting or piercing instru- ments | M | — | — | — | — | — | 1 | 5 | 19 | 9 | 4 | 1 | 3 | 42 |
| | | F | — | — | — | — | — | — | 1 | 1 | 1 | — | — | — | 3 |
| 185. | Fractures .. | M | — | — | — | 1 | 2 | 2 | 7 | 20 | 14 | 9 | 6 | 2 | 63 |
| | | F | — | — | 1 | 1 | — | — | — | 1 | 1 | — | — | — | 4 |
| 186. | Other Violence .. | M | — | — | — | 2 | 1 | 2 | 4 | 13 | 3 | 2 | 2 | — | 29 |
| | | F | — | — | — | 2 | 1 | — | — | — | — | — | — | 1 | 4 |
| XIV. Ill-Defined Causes. | | | | | | | | | | | | | | | |
| 187. | Dropsy | M | — | — | 1 | 2 | — | — | 2 | 3 | 5 | 11 | 11 | — | 35 |
| | | F | — | — | 1 | 1 | 2 | — | — | 6 | 6 | 3 | 7 | — | 26 |
| 189-A. | Heart Failure .. | M | — | — | — | — | — | — | — | — | 1 | — | 1 | — | 2 |
| | | F | — | — | 1 | — | — | — | — | 2 | 1 | — | 1 | — | 5 |
| 189-B. | Atrophy debility, marasmus .. | M | — | — | 25 | 7 | — | — | 2 | 5 | 2 | 3 | 3 | — | 47 |
| | | F | — | — | 22 | 3 | — | 2 | — | 2 | 5 | 3 | 5 | — | 42 |
| 189-D. | Pyrexia | M | 16 | 38 | 55 | 12 | 7 | 8 | 19 | 39 | 27 | 20 | 12 | — | 253 |
| | | F | 9 | 35 | 46 | 13 | 5 | 2 | 8 | 15 | 13 | 4 | 4 | — | 154 |
| 189-E. | Other Ill-defined deaths .. | M | 3 | 3 | 2 | — | — | — | — | 8 | 6 | 10 | 3 | 2 | 37 |
| | | F | 1 | 3 | 2 | — | — | — | — | 1 | — | — | — | 4 | 11 |
| 189-F. | Cause not Specified . | M | 2 | 1 | 1 | — | — | — | 1 | 3 | 3 | 1 | — | 4 | 16 |
| | | F | 2 | 2 | 2 | — | — | — | — | 1 | — | — | — | 2 | 9 |
| Total Males .. | | | 937 | 843 | 612 | 185 | 86 | 263 | 746 | 1,970 | 1,751 | 1,424 | 1,044 | 46 | 9,907 |
| Total Females .. | | | 764 | 677 | 539 | 174 | 88 | 100 | 199 | 486 | 373 | 322 | 527 | 9 | 4,258 |
| Grand Total .. | | | 1,701 | 1,520 | 1,151 | 359 | 174 | 363 | 945 | 2,456 | 2,124 | 1,746 | 1,571 | 55 | 14,165 |

MORTALITY ACCORDING TO NATIONALITIES AND AGES.

The following return shows the number of deaths at different age periods in the different nationalities:—

| Nationalities. | Sex. | Under 3 months. | 3—12 months. | 1—5 years. | 5—10 | 10—20 | 20—25 | 25—35 | 35—45 | 45—55 | Over 55 | Unknown | Total |
|----------------|------|-----------------|--------------|------------|------|-------|-------|-------|-------|-------|---------|---------|-------|
| Europeans | M | 2 | — | 1 | 1 | 1 | 6 | 6 | 12 | 6 | 10 | — | 45 |
| | F | — | — | 1 | — | — | 1 | 1 | — | 1 | 7 | — | 11 |
| Eurasians | M | 6 | 6 | 6 | 3 | 2 | 1 | 2 | 8 | 8 | 9 | — | 51 |
| | F | 5 | 4 | 5 | 1 | 1 | 3 | 4 | 4 | 10 | 19 | — | 56 |
| Chinese | M | 734 | 651 | 512 | 153 | 270 | 597 | 1,564 | 1,505 | 1,244 | 841 | 42 | 8,113 |
| | F | 613 | 533 | 444 | 151 | 140 | 155 | 351 | 289 | 227 | 358 | 9 | 3,270 |
| Malays | M | 146 | 141 | 58 | 20 | 31 | 47 | 140 | 79 | 66 | 118 | — | 846 |
| | F | 110 | 111 | 68 | 12 | 33 | 26 | 77 | 50 | 49 | 119 | — | 655 |
| Indians | M | 43 | 36 | 32 | 7 | 42 | 91 | 249 | 140 | 96 | 58 | 3 | 797 |
| | F | 35 | 26 | 19 | 10 | 14 | 14 | 48 | 25 | 24 | 20 | — | 235 |
| Others | M | 6 | 9 | 3 | 1 | 3 | 4 | 9 | 7 | 4 | 8 | 1 | 55 |
| | F | 1 | 3 | 2 | — | — | — | 5 | 5 | 11 | 4 | — | 31 |
| Total Males | | 937 | 843 | 612 | 185 | 349 | 746 | 1,970 | 1,751 | 1,424 | 1,044 | 46 | 9,907 |
| Total Females | | 764 | 677 | 539 | 174 | 188 | 199 | 486 | 373 | 322 | 527 | 9 | 4,258 |
| Grand Total | | 1,701 | 1,520 | 1,151 | 359 | 537 | 945 | 2,456 | 2,124 | 1,746 | 1,571 | 55 | |

The six chief causes of death for the last five years were:—

| | 1923 | 1924 | 1925 | 1926 | 1927 |
|-----------------|------|------|------|------|------|
| Pneumonia .. | 1244 | 1262 | 1481 | 1843 | 2291 |
| Tuberculosis .. | 1434 | 1276 | 1254 | 1370 | 1523 |
| Convulsions .. | 644 | 839 | 877 | 1114 | 1405 |
| Malaria .. | 869 | 848 | 962 | 1600 | 1287 |
| Beri beri .. | 636 | 678 | 740 | 798 | 1078 |
| Dysentery .. | 514 | 576 | 605 | 657 | 699 |

GENERAL DEATH RATE.

The death rate was 33.08 per 1000 as against 32.04 for 1926 and an average of 32.58 for the past 10 years.

The Pneumonias accounted for 2291 and Tuberculosis (Phthisis 1436) for 1523 deaths as against 1843 & 1370 respectively in the year 1926. The deaths from these two causes total 3814 and constitute over 25% of the deaths from all causes. No better proof of the increasing overcrowding that prevails and its more terrible consequences could be found. Both these diseases are preventable in that they are spread by compelling people to live in close proximity to each other in insanitary, ill lit, unventilated cubicles and single rooms.

Since writing my last report the Improvement Ordinance has become law and the Trust is now in being. Naturally its operation will be slow and we must have patience. But I do wish to emphasise that the overcrowding to day in Singapore is so terrible that in some cases

very drastic measures will have to be taken. In other words if the Trust is to do any good the Act must be interpreted in its very widest sense. And if it is so interpreted it will meet with strong and influential opposition.

Personally, from a close study of slum town, I am coming to the opinion that, within limits, it is better left alone and all the money and energy available expended in opening up outlying areas and so encouraging the building of more modern sanitary property which may be let at reasonable rentals.

I maintain that China town is not overcrowded as so many loosely aver, because the Chinese will herd together. The Chinese are crowded together today in Chinatown for the simple reason that there is nowhere else for them to go. The cubicle evil is entirely one of economics and represents an attempt to get the last possible individual squeezed into the only available housing. The rentals obtained for cubicles in the slums are no real indication of the value of the property. It is an entirely inflated value due to the fact that every house is sheltering three times as many people as it ought to do.

I am convinced that were new areas close to town opened up by roads drains and other municipal services houses would spring up like mushrooms. Owing to the cheap value of the land these houses will be let at far lower rentals and there will be no lack of tenants. Meantime building in the areas most closely adjacent to Chinatown is stifled for lack of access and has been so stifled for many years.

The net result, I am confident, will be that the crowded slum property or at any rate that part of it which is used for purely domestic purposes, must fall in value, which brings me back to my original contention that the existing slums are to a certain extent better left alone—at present. Later when we wish to improve them it will be so much less costly to do so.

The number of deaths from malaria though less than that of last year is still much above the average of the past few years. Returns from the General Hospital and Tan Tock Seng Hospital would indicate that many of the cases come from outside. The returns themselves are of little value in showing what is the actual amount of malaria in Singapore as the addresses given by many of the patients are in localities where we know definitely that malaria cannot be contracted. At the same time there was an exceptional amount of malaria in certain districts—notably Geylang. The only Anopheline implicated here is *A. Ludlowi* and, since my report of last year much has been done to limit its breeding grounds.

But there is something yet to be explained about this particular mosquito and its carrying powers. Fifteen years ago I could find this mosquito breeding literally in millions all over the town area. But it caused very little malaria. To-day it is breeding in comparatively small numbers and in few areas but malaria is prevalent in those areas where previously it was non-existent. Whatever the case this mosquito would appear to be a much more facile carrier than previously which means, if true, that we must readjust our ideas with regard to it and the measures to limit its breeding grounds deemed sufficient some years ago will have to be greatly amplified. I am afraid it will be a costly and a protracted matter involving nothing short of the complete reclamation of the many acres of mud flats surrounding the Kallang and Geylang River basins.

INFANTILE DEATH RATE.

The infantile death rate was 227.6 per 1000 births compared with 232 in 1926 and 210.3 in 1925. The rate for each nationality and sex was as follows, 1926 figures being given for comparison.

| | Males. | | Females. | | Total. | |
|--------------|--------|-------|----------|-------|--------|-------|
| | 1926 | 1927 | 1926 | 1927 | 1926 | 1927 |
| Europeans .. | 63.4 | 26.5 | 14.7 | Nil | 38.1 | 14.6 |
| Eurasians .. | 182.9 | 139.5 | 145.1 | 120.0 | 166.6 | 130.4 |
| Chinese .. | 229.9 | 225.0 | 219.2 | 212.5 | 225.0 | 219.2 |
| Malays .. | 356.7 | 375.1 | 299.7 | 332.3 | 329.0 | 355.2 |
| Indians .. | 245.3 | 226.6 | 170.7 | 174.7 | 207.9 | 200.5 |
| Others .. | 164.5 | 164.8 | 164.8 | 44.9 | 164.7 | 105.5 |
| Total .. | 241.0 | 236.7 | 221.6 | 217.2 | 232.0 | 227.6 |

These figures do not call for any special comment. All that I can say is, that, in the face of the increasingly insanitary surroundings into which most of the Singapore babies are born, I am glad to report a decrease on last year's figures, however small. Of the 9981 mothers visited after confinement by the Sisters of the Welfare Branch, 8037 were found to be living in cubicles or single rooms. It does not require much imagination to visualise the unequal struggle these babies have for existence.

I am inclined to give the whole credit of the fact that we are holding our own to the work done by the Welfare Branch.

CORRECTED INFANTILE DEATH RATE.

From figures supplied by the Protectorate it is found that during the year 7172 infants were landed here from China, 3526 were recorded as having left for other parts leaving 3646 who presumably were added to our infant population. If these are added to the total births then the infantile mortality rate falls to 180.9 per 1000. The corresponding figure for 1926 was 185 and for 1925, 177.5.

CERTIFICATION OF DEATHS.

The following return shows the percentage of deaths the causes of which were certified by medicalmen, the Coroner, and the Inspecting Registrars respectively:—

| | Europeans | Eurasians | Chinese | Malays | Indians | Others | TOTAL |
|------------|-----------|-----------|---------|--------|---------|--------|-------|
| Registrars | 1 | 15 | 3078 | 921 | 249 | 5 | 4269 |
| Medicalmen | 48 | 90 | 7574 | 553 | 678 | 73 | 9016 |
| Coroner .. | 7 | 2 | 731 | 27 | 105 | 8 | 880 |
| Total .. | 56 | 107 | 11383 | 1501 | 1032 | 86 | 14165 |

This gives a percentage of 30.1 certified by Registrars as against 34.1 last year, 63.6 by Medicalmen as against 59.6 last year and 6.2 certified by the Coroner as against 6.2 last year.

The percentages for the last 10 years have been as follows:—

| | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 |
|------------|------|------|------|------|------|------|------|------|------|------|
| Registrars | 38.8 | 39.9 | 36.8 | 36.1 | 35.1 | 37.3 | 35.0 | 33.9 | 34.1 | 30.1 |
| Medicalmen | 55.8 | 55.2 | 58.1 | 58.3 | 58.2 | 55.4 | 58.5 | 58.7 | 59.6 | 63.6 |
| Coroner | 5.3 | 4.8 | 5.0 | 5.4 | 6.5 | 7.1 | 6.3 | 7.2 | 6.2 | 6.2 |

V. REGISTRATION OF BIRTHS AND DEATHS.

The numbers registered at the different offices were as follows:—

| | Births. | Deaths. |
|--------------------------|--------------|--------------|
| Central Office .. | 1,192 | 3,975 |
| Prinsep Street Office .. | 7,725 | 6,088 |
| Kreta Ayer Office .. | 5,235 | 4,102 |
| | <hr/> 14,152 | <hr/> 14,165 |

Twenty six births and 5 deaths were registered in the Post Registration Books and the sum of \$240 was received in late registration fees.

Five queries were sent to Medical Practitioners for further information where the causes of death had been indefinitely stated.

VI. ANALYST.

During the year 13,412 samples were submitted for analysis. Details will be found in Mr. Harrington's report which is appended.

Municipal Water Supply. 9,607 samples taken from all points were analysed and the results again show that the high standard of purity reported, in previous years was maintained. A good deal of trouble was experienced during the year with the bad colour of the water and it was proved that this was due to the redissolving of iron oxide which had previously been deposited on the filter beds.

This only happens during certain seasons of the year and as Mr. Harrington points out is presumably due to the generation of carbonic acid gas on the surface of the filter beds. Experiments are being carried out with a view to correcting this trouble.

Chlorination to a small degree was still carried out at both reservoirs and no taste troubles were reported.

Gunong Pulai samples taken at the usual sources were of good quality but samples taken at the end of the pipe line were contaminated on occasions. This is undoubtedly due to the work being carried out on the dam site and in the catchment.

48 samples of Well Water out of the 52 examined were condemned as unfit for use.

Municipal Sewage Works. A large number of samples from this source were analysed. The Imhoff tanks were not working as well towards the end of the year as they should do. This was due to increased flow and escape of gas into the channels. The coral and granite beds still continue to give a satisfactory effluent and the intermittent dosing of the Imhoff tank effluent with small doses of chlorine was continued.

The experimental Bio Aeration unit was started in September and Mr. Harrington's report gives the details of its working very fully. It would appear that the sewage requires a full 24 hours stay in the Aeration Tank to give a satisfactory effluent.

Private Sewage Installation. 542 samples were analysed. Samples of the effluents taken were generally very fair. It would appear however that the coral beds of some of the older installations require cleaning and renewal.

Milk Supplies. 290 samples were collected from itinerant vendors and 20% were adulterated. 89 samples of milk from other sources were analysed and the results were on the whole satisfactory.

106 other samples of food supplies were analysed.

A large number of samples for the various Engineering Departments were analysed.

VII. BACTERIOLOGIST.

Public Health Examinations. 11,506 specimens were received for examination a number greater than that in any previous year. Details will be found in Dr. Gilmour's report which is appended.

Rats. The bodies of 4,137 rats were examined. None were found infected with plague.

Milk. 121 samples of fresh milk were examined by the Methylene Blue Reduction test. 112 of these samples were either poor or very poor and the results merely confirm what is already known of the very unsatisfactory state of the fresh milk trade here.

Water. 7,490 samples of water from different points in the supply were examined. A very pure water has been consistently supplied, in fact the quality as regards purity is fully equal to the best waters supplied at home.

Mortuary. 16 post mortems were made during the year. In only 6 cases was the cause of death one of the notifiable Infectious Diseases viz: Cholera 3 cases, Bubonic Plague 1 case, Smallpox 1 case, and Cerebro-Spinal Meningitis 1 case.

VIII. ANTIMOSQUITO WORK.

Dr. Dawson's report is appended.

Anti-malarial Work. New works were carried out in eight areas all of which were completed during the year except that at Adam Road where work is still in progress.

In those areas 708 yards of subsoil pipes and 4,399 yards of concrete channel drains of anti-malarial type were put down, while 9,123 yards of main earth ditches were cut.

Extension and repairs in existing areas involved the laying of a further 4,900 yards of subsoil pipes and 1,303 yards of concrete channels.

At the end of 1927 there had been completed since the work was first begun, 18 $\frac{1}{4}$ miles of concrete channels, 47 miles of subsoil pipes and 19 $\frac{3}{4}$ miles of main open earth ditches. The cost of maintaining the areas in which these are situated, during the year was approximately \$20,300 or 4.7 cents per head of estimated population.

The total expenditure during the year on maintenance and new work was about \$128,000. This is approximately 30 cents per head and includes all charges.

During the year 5 gangs of 20 men each were permanently employed in maintaining the finished areas; 2 gangs were permanently employed in Patrol work which consists mostly of the recurring cleaning of compounds and waste lands collecting and disposing of empty tins etc. and clearing undergrowth. 3 gangs were employed on new works in small areas, draining lowlying land and filling ponds, while 6 gangs were employed on new work in larger areas.

The bunding of a large area in the Geylang Road district mentioned in my report of last year as part of the general Anti-Ludlowi campaign was completed early in the year. The work was not easy on account of the difficulty of obtaining suitable earth on the spot with which to construct the bund. As finally completed it extends for a distance of 1 mile and 109 yards. So far as one can see these measures have been successful and Ludlowi breeding has been prevented over many acres. The bund naturally is not of very strong construction and requires a good deal of attention. The supervision and maintenance throw a heavy burden both on my staff and my votes and I think steps should be taken to put the onus of maintaining it on the owners of the adjoining land.

Bunding and draining by tidal flaps were carried out on a smaller scale in other areas, notably at Target Road, but many hundreds of acres in the Kallang and Geylang basins still remain to be done and I am afraid with the staff and funds at my disposal it will take several years still to abolish all the Ludlowi breeding grounds.

In my remarks under the death rate I pointed out that the Ludlowi problem is a much more serious one than it was some years ago. There is now need for haste. In talking of these swamps in past reports I have always said that the only logical and economic way, in Singapore at least where land is of value, to abolish these breeding grounds is to fill them. During the past few years there has been much talk of employing a Dredge to lagoon and fill these areas but so far the Dredge has failed to materialise and seems as far off as ever.

GUNONG PULAI.

During the year the average monthly population was 903. Records of all fever cases were carefully kept by the medical officer. 147 cases of fever were recorded as showing the presence of parasites in the blood. 57 of these were definitely known to be relapses of cases already occurring in the Gunong. This leaves a total of 90 who had their first attack in the Gunong. Though many of these gave a history of Malaria elsewhere and 14 developed fever after periods varying from 12 to 23 days residence in the Gunong, nevertheless all were treated as having contracted their infection in the Gunong. This gives a malaria rate of 99 per 1,000 per annum.

PONTIAN.

Practically no permanent work of any magnitude has yet been carried out here.

The measures advocated for drying out the swampy jungle in front of the village, namely thinning out undergrowth and trees up to four inches in diameter and cutting big main ditches through the jungle, proved successful, the malaria rate falling steadily throughout the year. All seepages have been defined in small earth ditches which at present are being oiled. The work of subsoil piping these is now in hand. It is not intended to do anything further with the main open ditches except to maintain them.

During the year the average labour force was 403. It was rather difficult to keep records accurately as the medical officer could not visit daily. 74 cases were recorded as showing the presence of parasites. And though almost all of them gave a history of malaria elsewhere all have been taken as having been contracted at Pontian, which gives a fever rate of 183 per 1,000.

47 of the cases occurred in the first four months of the year and only 5 in the last five months which would indicate that the anti malarial measures in course of construction during the year were successful.

In this connection I would like to say that the floating casual labour of South Johore is heavily infected with malaria. It is my experience that 50 to 75% of the coolies coming to Pontian and the Gunong for work show signs of splenic enlargement. And one could not afford to weed them out as one would have like to do. It would only mean a shortage of labour, increased rates and trouble with the petty contractors.

IX. NURSES AND CLINICS.

The European nurses paid 12,974 visits including 10,029 first visits, 1,425 revisits and 1,520 wrong addresses.

First visit. Infants seen numbered 9,507 or 67.1% of the total births as compared with 66.2 per cent in 1926. Of these 97 were ailing and in 218 cases the cord was unhealthy.

There were 46 cases of twin births and one of triplets. Infants not seen numbered 522 of whom 210 had been put out to nurse, 239 were still born and 73 had died before a visit could be paid.

7,606 infants were being breast fed, 1,684 were receiving tinned milk, 215 were partly on breast milk and partly on tinned milk, while 2 were receiving other suitable foods.

Of the 1,925 bottles in use 685 were of unsuitable pattern, while 23 were dirty.

The condition of the mothers when first visited was satisfactory in 9,867 cases, unsatisfactory in 84, while two had been removed and 28 had died.

Of the mothers 70 had been attended by medicalmen, 22 by A. Class midwives, 6,793 by B. Class, 1,623 by C. Class, 1,103 by friends while the remaining 370 were unattended.

Of the 9,981 mothers seen, 8,037 were living in cubicles or single rooms and 1,944 in houses of more than one room.

Revisits. 1,425 mothers and 1,425 infants were seen on revisits. Of the former 1,388 remained in a satisfactory condition, 21 less so, 12 had removed and 4 had died. Of the infants 1,375 were satisfactory, 15 were ailing, 14 had been removed and 21 had died.

The chief infantile ailments were Thrush, Conjunctivitis and Marasmus.

CLINICS.

During the year 9,172 new babies were entered on the Clinic Books.

In the Clinics 19,113 consultations were held by the Sisters in charge.

In the districts first visits were paid by the Asiatic Health Visitors to 7,698 infants in their homes; 42,885 subsequent visits were paid to these infants.

There were 4,185 removals or wrong addresses, while 701 of the Clinic babies were reported as having died.

Summarised, the work of the two Clinics amounted to 79,852 consultations on 9,172 babies.

Provision was made in the 1928 Budget for four more Asiatic Health Visitors bringing the number up to twelve.

As mentioned in my remarks under vaccination the checking up of the vaccination state will become one of the duties of the Asiatic Health Visitors.

X. MIDWIVES.

At the end of the year there were 399 midwives on the Register. During the year the registered midwives attended 8,774 cases.

The following return shows the number and nationality of cases attended by B. and C. class midwives.

| | | | |
|----------------------------|----|----|-----------|
| Europeans | .. | .. | 4 |
| Eurasians | .. | .. | 83 |
| Chinese | .. | .. | 7,318 |
| Malays | .. | .. | 1,060 |
| Indians | .. | .. | 213 |
| Others | .. | .. | 45 |
| Total | .. | .. | 8,723 |
| <hr/> | | | |
| A. class midwives attended | .. | | 51 cases. |
| B. & C. „ „ | .. | | 8,723 „ |
| In Hospitals there were | .. | | 2,095 „ |
| Total | .. | | 10,869 „ |

The number of births registered during the year was 14,152 so that 76.8 per cent of the mothers received some kind of skilled attention at the birth of their children.

In 775 cases the whole of the midwife's fee and in 1,199 part of it, was paid by the Commissioners—the total amount paid being \$7,322.

XI. FOOD AND MARKETS.

The report of the Market Inspector is appended.

XII. FOOD SHOPS ETC.

Licenses were issued for—

| | |
|-----|--------------------------|
| 401 | Coffee Shops |
| 244 | Eating Houses. |
| 76 | Meat Shops. |
| 18 | Bakeries. |
| 12 | Aerated Water Factories. |
| 4 | Biscuit Factories. |
| 209 | Milk Vendors. |
| 220 | Lodging Houses. |

XIII. PLACES OF PUBLIC RESORT.

Theatres, Hotels, Public houses, Liquor Shops and Cinematograph Halls were periodically inspected—notice being served where necessary prior to renewal of licence.

XIV. SLAUGHTER HOUSES.

247,520 animals were received for slaughter compared with 233,014 in 1926.

The figures were as follows:—

| | | 1926 | 1927 |
|-----------|----|---------------------|---------------------|
| Pigs | .. | 168,164 | 179,900 |
| Sheep | .. | 33,320 | 32,643 |
| Goats | .. | 8,770 | 10,939 |
| Bullocks | .. | 22,374 | 23,107 |
| Buffaloes | .. | 386 | 931 |
| | | <hr/> 233,014 <hr/> | <hr/> 247,520 <hr/> |

33 animals were rejected as being in bad condition. The carcasses of 1,759 dead or diseased animals, and 6,807 parts of animals injured or diseased were destroyed.

23,132 Australian sheep were received for slaughter.

281 Australian cattle were slaughtered at the temporary Abattoir at Bukit Timah.

XV. OFFENSIVE TRADES.

1,848 licenses for offensive trades were issued the fees amounting to \$6,647.

There were 149 prosecutions for carrying on offensive trades without licence and 118 convictions were obtained with fines amounting to \$838.

XVI. HAWKERS.

During the year the control of this work was handed over to the Conservancy department much to the relief of every one concerned in this department, as the eternal purposeless conflict with the hawkers was beginning to interfere with the legitimate work of the department.

XVII. BURIAL GROUNDS.

The number of burials in Municipal Burial grounds was as follows:—

Bidadari—

| | | 1927 | Since opening. |
|---------------------------|----|------|----------------|
| Protestant Division | .. | 168 | 2,393 |
| French Roman Catholic | .. | 175 | 2,749 |
| Portuguese Roman Catholic | .. | 63 | 1,021 |
| Pauper Division | .. | 630 | 8,919 |

Serangoon Road—

| | | | |
|------------|----|-----|-------|
| Mohammedan | .. | 533 | 3,861 |
| Pauper | .. | 147 | 354 |

Bukit Brown—

| | | | |
|---------|----|-----|-------|
| Chinese | .. | 797 | 2,595 |
| Pauper | .. | 553 | 1,799 |

Infectious Disease—

| | | | |
|-------------------|----|----|-----|
| Serangoon Road | .. | 56 | 565 |
| Yeo Chu Kang Road | .. | — | 554 |

Hindoo Cemetery—

| | | | |
|------------|----|-----|-----|
| Burials | .. | 351 | 661 |
| Cremations | .. | 137 | 244 |

| | | | |
|-------|----|-------|--------|
| Total | .. | 3,610 | 25,715 |
|-------|----|-------|--------|

The Burial ground inspector made 4,265 inspections during the year while he attended 103 exhumations.

There were 147 cremations.

The following return shows the number of burial grounds in use, Public and Private belonging to various nationalities within municipal limits:—

| | | | Public. | Private. | Total. |
|-----------------------------|----|----|---------|----------|--------|
| Christian | .. | .. | 2 | — | 2 |
| Jewish | .. | .. | 1 | — | 1 |
| Parsee | .. | .. | 1 | — | 1 |
| Parsee Islam | .. | .. | 1 | — | 1 |
| Malay | .. | .. | 5 | 5 | 10 |
| Hokien | .. | .. | 8 | 78 | 86 |
| Teochew | .. | .. | 1 | 9 | 10 |
| Hindoo | .. | .. | 1 | — | 1 |
| Kling Islam | .. | .. | 1 | 2 | 3 |
| Prison and General Hospital | .. | | 1 | — | 1 |
| | | | 22 | 94 | 116 |

The total number of burials inside municipal limits for the year was 8,602 made up as follows:—

| | | | |
|-----------|----|----|-------|
| Europeans | .. | .. | 78 |
| Eurasians | .. | .. | 129 |
| Chinese | .. | .. | 5,749 |
| Malays | .. | .. | 1,881 |
| Indians | .. | .. | 736 |
| Others | .. | .. | 29 |
| | | | <hr/> |
| | | | 8,602 |
| | | | <hr/> |

XVIII. STAFF.

Dr. A. Thurai, Inspecting Officer was appointed Medical Officer in charge of staff, while Dr. Ganapragasam was appointed Inspecting Officer.

Mr. Benjafield, Chief Sanitary Inspector returned from long leave in November.

HEALTH OF MUNICIPAL STAFF.

There were 8,153 cases of sickness treated, 842 persons were sent to hospital, 7,322 days sick leave granted and 6,740 dressings applied. 217 visits were paid to patients in their houses.

XIX. GENERAL.

There were 10,632 notices including 3,629 intimations, served during the year which with 2,072 from the previous year made a total of 12,704. Of these 11,240 were complied with.

There were 29 arrest cases mostly for selling milk without a licence.

There were 74,169 visits of inspection paid by the Sanitary Inspectors 1,819 prosecutions 1,540 convictions with fines imposed amounting to \$11,060.50, 279 prosecutions were withdrawn.

The following reports and returns are appended:—

- Report of Analyst.
- Report of Bacteriologist.
- Anti-mosquito Report.
- Report of Superintendent, Middleton Hospital.
- Report of Food and Market Inspector.
- Return of Inspection, Prosecution & c.
- Return of Notices.
- Summary of Arrest Cases.
- Return of Licenses for Offensive Trades.

In conclusion I have to thank all members of the department for their continued loyal support throughout the year.

I have the honour to be,

Sir,

Your obedient servant,

P. S. HUNTER,

M.A., M.B., CH.B., D.P.H.,

Municipal Health Officer.

SINGAPORE MUNICIPALITY

TWENTIETH ANNUAL REPORT

OF THE

**MUNICIPAL ANALYTICAL
LABORATORY**

FOR THE YEAR

1927

BY

A. G. HARRINGTON, F. I. C., F. C. S.

Municipal Health Office,

Singapore, 18th January, 1928.

THE MUNICIPAL HEALTH OFFICER.**SIR,**

I have the honour to submit herewith the Twentieth Annual Report of the Municipal Analytical Laboratory.

During the year 1927 a total of 13,142 samples were analysed and the following table summarises the nature of these samples.

| | | |
|--|-------|-------|
| Waters from Municipal Public supply | .. | 9,607 |
| Waters from Johore | .. .. | 41 |
| Well Waters | .. .. | 52 |
| Miscellaneous Waters | .. .. | 38 |
| Sewages Effluents etc. from Municipal Sewage works | | 1,823 |
| Sewages Effluents etc. from Private Installations | .. | 542 |
| Milks from Itinerant Vendors | .. .. | 290 |
| Tinned Milks | .. .. | 63 |
| Milk Foods | .. .. | 8 |
| Emulsified Milks | .. .. | 18 |
| Cream | .. .. | 5 |
| Butter | .. .. | 8 |
| Flour | .. .. | 10 |
| Tea | .. .. | 8 |
| Coffee | .. .. | 12 |
| Tinned Meat, Fish and Vegetables | .. .. | 22 |
| Aerated Waters | .. .. | 17 |
| Sugar | .. .. | 6 |
| Alcoholic Liquors | .. .. | 14 |
| Quinine Tablets | .. .. | 4 |
| Samples from Municipal Engineer | .. .. | 67 |
| Samples from Gas Engineer | .. .. | 22 |
| Samples from Electrical Engineer | .. .. | 105 |
| Samples from Water Engineer | .. .. | 205 |
| Samples from Bridge Engineer | .. .. | 5 |
| Samples from Sanitary Engineer | .. .. | 5 |
| Samples from Building Surveyor | .. .. | 6 |
| Samples from Health Department | .. .. | 47 |
| Action of Water on Concrete Pipes | .. .. | 92 |

WATERS FROM MUNICIPAL PUBLIC SUPPLY.

During the year 9607 samples of water from the Municipal public supply were analysed. The samples came from the Impounding Reservoirs, the streams feeding these Reservoirs, Filter Beds at Bukit Timah Road and Woodleigh, clear water tanks, high level service reservoirs, and various stand pipes and taps in the town.

The water passed into the Town's supply showed no signs of unoxidised sewage contamination on any occasion and as the samples were analysed daily the water was above suspicion throughout the year. Reviewing the whole of the year's results it may be said that the town's supply was better than on any previous year in which I have analysed it. This is accounted for by the fact that 100% of the water was filtered through the sand filter beds.

The intermittent contamination in some of the streams leading into Thomson Road Reservoir that has been reported for the last two years has continued to a small degree. The distance that the outlets of these streams are from the outlet valves of the reservoir, gives sufficient time for these small contaminations to become fully oxidised in their passage down the reservoir and thus to be rendered innocuous. Daily analyses of samples taken from the Valve Tower at Thomson Road Reservoir were made and on every occasion the water was above suspicion.

Daily analyses were made of samples taken from the various streams and the Valve Tower at the Kallang River Reservoir. The results showed that this supply was above suspicion.

The great trouble experienced during the year was the bad colour of the water about the month of August. Water drawn from taps was on occasions very brown and muddy and on standing a heavy deposit settled out. This caused a number of complaints. An analysis of the deposit showed it to consist mainly of iron oxide with a certain amount of clay and vegetable matter. Subsequent experiments showed that the redness of the water was due to soluble iron which had passed through the filters being rendered insoluble by aeration.

As this trouble generally occurred about the same time of year the iron values of a large number of samples from various points in the water works were made. The results revealed the surprising fact that some of the filter beds both at Bukit Timah Road and Woodleigh were yielding filtrates which were very high in dissolved iron compounds. The worst filtrates were yielded by those beds which had been running longest. In many cases the filtrates contained five to ten times the amount of iron normally present in the reservoir water. The first explanation which suggested itself for this fact was that the character of the raw water had changed and that it was redissolving out iron compounds which had been precipitated in the filter beds. However as the PH value of the water had not changed it was suggested that the iron was redissolved by the agency of carbonic acid generated from the decomposing vegetable matter on top of the bed. The iron is probably deposited in the form of oxycarbonate or hydroxide and is redissolved as the bi-carbonate. A confirmation of this was made by determining the free carbonic acid in the water at various points. It was found that the water on passing through a filter bed acquired carbonic acid and that the amount increased as the bed grew older. Complaints about the redness of the water are always received during the hotter season of the year and it is suggested that the warmer weather favours of the growth of the organisms which attacks vegetable matter deposited on the filter bed and that therefore the amount of carbonic acid increases. This has been upheld by carbonic acid determinations made later in the year. Iron determinations made later in the year, showed results similar to those

obtained earlier in the year i.e. low iron contents except that at Bukit Timah Road Filters the iron content increased considerably after the bed had been running for several days. Experiments were tried of adding lime to the water. If the theory of the iron being dissolved by the agency of carbonic acid is correct then the trouble should be minimised as the calcium hydroxide should combine with the carbon dioxide and form the insoluble calcium carbonate. As the iron trouble had practically ceased by the time it was possible to put the liming into operation the true effects could not be observed and it is proposed to continue the experiments when the trouble starts again. The Water Engineer also proposes to aerate the water as far as possible before filtration. This should precipitate soluble iron which would be filtered out on the top of the sand beds and would be wholly removed when the bed was scraped

The filter beds at Bukit Timah Road compared with those at Woodleigh have only worked fairly during the year. The iron trouble there has been more marked and it would appear that the insoluble iron, vegetable matter etc has worked well into the bodies of the beds. The colour of the water from the Clear Water Tank is always far worse than that at Woodleigh. Chlorination of the water at Thomson Road Reservoir was carried out during the year and no trace of free chlorine could be discovered by taste or chemical tests in the waters from the Bukit Timah Road filters.

The filter beds at Woodleigh have worked excellently throughout the year except during the hottest weeks when the iron trouble was experienced. Long runs at high rates with filtrates of excellent colour and chemical figures have been obtained. Chlorination of the water at Woodleigh has been carried out during the year and no free chlorine in the treated water has been detected by taste or chemical tests.

Samples from the service reservoirs were analysed daily. In every case they were free from contamination. As this water represents that delivered direct to the town the results are very satisfactory.

Samples of water from various taps in the town were analysed from time to time. On occasions the amount of vegetable matter and iron was very high and the appearance of the water was very bad indicating that the pipes required flushing. On no occasion was the water contaminated with harmful organic matter.

The colour of a sample of water drawn from a tap in my laboratory was taken daily in a 2 foot tube by a Lovibond's Tintometer. During the hotter seasons of the year when the iron troubles were experienced the colours were sometimes very bad. On other occasions the yellow colour registered varied between 4 and 1 which can be considered quite good.

Samples of water from the Seletar area were analysed daily. The contamination of this supply was infrequent. When this supply was in use it was chlorinated and analyses of this treated water were made daily with satisfactory results.

I append the results of chemical analyses of average samples of water taken from the two impounding reservoirs and an average sample of filtered waters.

| | Results expressed in parts per 100,000. | | |
|--|---|----------------------------------|-------------------|
| | Thomson Road Reservoir | Kallang River Reservoir | Filtered Water |
| Total Solids .. | 2.20 | 2.43 | 0.86 |
| Total Organic Solids .. | 1.18 | 1.24 | 0.39 |
| Total Inorganic Solids .. | 1.02 | 1.19 | 0.47 |
| Suspended Organic Solids .. | 0.77 | 0.81 | 0.02 |
| Suspended Inorganic Solids . | 0.57 | 0.69 | 0.02 |
| Dissolved Organic Solids .. | 0.41 | 0.43 | 0.37 |
| Dissolved Inorganic Solids .. | 0.45 | 0.50 | 0.45 |
| Chlorine as Chlorides .. | 0.03 | 0.03 | 0.03 |
| Free and Saline Ammonia .. | Absent | Absent | Absent |
| Albuminoid Ammonia .. | 0.005 | 0.006 | 0.001 |
| Nitrogen as Nitrites .. | Absent | Absent | Absent |
| Nitrogen as Nitrates .. | Absent | Absent | Absent |
| Oxygen absorbed in 15 mins at 84° F. .. | 0.021 | 0.025 | 0.008 |
| Oxygen absorbed in 4 hours at 84° F. .. | 0.071 | 0.079 | 0.031 |
| Total Hardness .. | 0.5° | 0.5° | 0.5° |
| Temporary Hardness .. | 0.0° | 0.0° | 0.0° |
| Permanent Hardness .. | 0.5° | 0.5° | 0.5° |
| Poisonous Metals .. | Absent | Absent | Absent |
| Iron .. | 0.12 | 0.12 | 0.03 |
| Appearance in 2 ft. tube .. | slightly turbid | slightly turbid | Clear |
| Colour in 2 ft. tube { Yellow .. | 6.0 | 6.2 | 1.0 |
| { Red .. | 0.9 | 1.3 | 0.3 |
| Lovibonds { Blue .. | 0.4 | 0.4 | 1.3 |
| Microscopical Examination .. | Fungi and Vegetable Debris | Fungi and Vegetable Debris | Few Fungi |
| Reaction .. | Neutral | Neutral | Neutral |

WATERS FROM JOHORE.

Thirty nine routine samples from Gunong Pulai were analysed.

All these samples were free from unoxidised sewage matter and other harmful contamination.

The characteristics of this water are very similar to the present public supply. It is a very pure supply from the point of view of its potability and the only objection that can be taken to it is the vegetable matter and inorganic matter in suspension. The amount of vegetable matter in the water varies from time to time but it is probable that when this water is collected in a reservoir the water will be more constant in composition.

I append representative analyses of samples taken from the usual streams.

| | | Results expressed in parts per 100,00 | | |
|------------------------------|----------------------------------|---------------------------------------|------------|--------------------|
| | | Pulai II. | Pulai III. | Pontian Guages |
| Total Solids | .. | 3.35 | 3.01 | 3.42 |
| Organic Solids | .. | 1.05 | 0.84 | 0.83 |
| Inorganic Solids | .. | 2.30 | 2.17 | 2.59 |
| Free and Saline Ammonia | .. | 0.001 | Absent | Absent |
| Albuminoid Ammonia | .. | 0.002 | 0.001 | 0.003 |
| Chlorine as Chlorides | .. | 0.1 | 0.1 | 0.1 |
| Nitrogen as Nitrites | .. | Absent | Absent | Absent |
| Nitrogen as Nitrates | .. | Absent | Absent | Absent |
| Oxygen absorbed in 15 mins . | | 0.025 | 0.019 | 0.021 |
| Oxygen absorbed in 4 hours . | | 0.068 | 0.057 | 0.063 |
| Total Hardness | .. | 0.5° | 0.5° | 0.5° |
| Temporary Hardness | .. | 0.0° | 0.0° | 0.0° |
| Permanent Hardness | .. | 0.5° | 0.5° | 0.5 ^a |
| Poisonous Metals | .. | Absent | Absent | Absent |
| Iron | .. | 0.06 | 0.07 | 0.10 |
| Appearance | .. | Slightly Cloudy | Cloudy | Slightly Cloudy |
| Colour in 2 ft. tube | { Yellow .. Red .. Blue .. | 1.7 | 9.0 | 3.0 |
| | | 0.7 | 9.0 | 1.0 |
| Lovibonds | | 0.9 | 9.5 | 1.0 |
| Reaction | .. | Neutral | Neutral | Neutral |

Two samples of water from Pontian were analysed. Both were above suspicion.

Samples were taken daily of the Gunong Pulai water delivered from the pipe line into one of the streams of the Kallang River Reservoir. This water was found to be contaminated on several occasions.

WELL WATERS.

Fifty two samples were analysed and all except four were condemned as unfit for use owing to heavy contamination with unoxidised sewage matter.

All these contaminated samples were taken from the more populous district of the town and as I have consistently pointed out it is impossible for wells situated as these are to yield a pure supply. They must be constantly contaminated.

Four samples were taken from wells in the less populated parts of the town. Two of these were returned as fair and two as good. I recommended that further samples be taken from these wells during rainy weather.

MISCELLANEOUS WATERS.

Thirty eight samples were analysed.

Twenty four samples were received from Mandai Quarry. All of these contained a considerable excess of free chlorine showing that the amount of chlorinated Lime added is in excess or irregular. The chemical results vary and the water is only of poor quality.

Fourteen samples were sent in by the Water Engineer for decision as to whether water running down drains was due to broken mains or to natural causes.

**SEWAGES EFFLUENTS ETC. FROM MUNICIPAL
SEWAGE WORKS.**

1823 samples were received for analysis and these consisted of the following.

| | | | | | |
|----------------------|----|----|----|----|-----|
| Crude Sewage | .. | .. | .. | .. | 257 |
| Imhoff Tank Effluent | .. | .. | .. | .. | 303 |
| Filter Beds Effluent | .. | .. | .. | .. | 937 |
| Fall Samples | .. | .. | .. | .. | 243 |
| Bio-Aeration Unit | .. | .. | .. | .. | 82 |
| Sludge | .. | .. | .. | .. | 1 |

The strength of the crude Sewage varied very considerably during the first six months of the year. For instance the highest figure for suspended matter was 150 parts per 100,000 and the lowest 20 parts. During the second half of the year the strength was more constant and the suspended matter figures varied from about 70 to 35 parts per 100,000.

The Imhoff tanks worked fairly well at the beginning of the year but lately the proportion of suspended matter removed has not been so high as formerly. This is probably due to the increased flow. Another feature which also probably interferes with settlement of suspended matter in the Imhoff tanks is the large amount of gas which escapes into the channels instead of being trapped in the sludge digestion chambers.

Double treatment through the Imhoff Tanks was tried for about three months to see if this improved the final effluent. The Imhoff Tanks were divided into two series and the crude sewage was made to pass through two tanks instead of one. This resulted of course in a great increase in flow and it was this fact that prevented any increase in efficiency in fact results showed a tendency the other way. Double treatment was therefore discontinued.

Chlorination of crude sewage before it passed into the Imhoff Tanks was also tried.

It was hoped that this would tend to stop the formation of gas in the channels of the Imhoff Tanks and incidentally the formation of scum. Doses varying from 2 p.p.m. to 16 p.p.m. were tried with no good effect.

Intermittent chlorination of the Imhoff Tank effluent with 2 p.p.m. of chlorine has been continued throughout the year and the results on the whole have been quite satisfactory as the new and old beds still continue to yield a satisfactory effluent and I feel sure that but for this dosing the old coral beds would now be yielding an effluent that was very far from satisfactory. However the results are not as good as at first as the beds are becoming more and more choked with humus and until the beds (especially the old coral beds) are cleansed by the removal of all coral, washing it to get rid of the humus and then repacking the bed we are not likely to get highly satisfactory results. If the beds are choked with humus, only very little air can get into them and the nitrifying bacteria have therefore very little scope for their work.

Experiments were carried out by chlorinating a resting bed with water containing 50 to 100 p.p.m. of free chlorine in an attempt to get rid of some of this humus. These experiments were not successful.

The experimental Bio Aeration unit designed to take 250,000 gallons a day was completed during the year and experiments started on September 1st. The aeration tank was partially filled with Imhoff Tank effluent and the paddle wheels started. Small additions of effluent and sludge from the humus Tanks were made from time to time but nothing was taken out of the tank for 21 days. Samples were taken from the tank daily, allowed to settle for six hours and the supernatant liquid was then poured off and analysed. A comparatively clear effluent was obtained from the start containing 5.8 parts per 100,000 of suspended matter and absorbing 1.67 parts of oxygen from acid permanganate in 4 hours. These figures improved with a gradual diminution of free ammonia for six days. The oxygen absorbed figure then started to go up, nitrites increased, free ammonia fell to a very low figure and nitrates were only a trace. The oxygen absorbed figure rose as high as 2.75 parts. Samples of this effluent kept for 20 days did not however putresce. On the 19th day a remarkable increase in the nitrates from a trace to 1.6 parts per 100,000 was noted and the oxygen absorbed figure which had been gradually dropping before then, fell to the remarkably low figure of 0.4 parts per 100,000. The figures showed a gradual oxidation of the ammonias to nitrites and a more or less sudden conversion of the nitrites to nitrates. Throughout these 21 days the settled effluent was clear and had no offensive smell.

It was then decided to build up a sludge without the use of the Dortmann tanks. The following 24 hours cycle was introduced. 17 hours Aeration, 2 hours Settling, 3 hours Pumping out, and two hours filling with Imhoff Tank effluent. Samples during the pumping out process were taken daily and submitted for analysis. These were fairly clear, brownish in tinge with hardly any odour and non-putrescible. Analysis showed high free Ammonia, high nitrites, low nitrates and an oxygen absorbed figure varying between 1.2 and 1.6 parts per 100,000. This sludge building was continued for about 5 weeks and at the end of that period the proportion of sludge after six hours settlement increased to 25% by volume. Results obtained on the effluent towards the end of this period were very good and the oxygen absorbed figure fell to under 1 part per 100,000 but the nitrates were only a trace whilst Ammonias were high. Drawing off was then stopped for 48 hours and the liquid aerated by the paddle wheels during that period. The ammonias dropped very quickly and the nitrates rose which showed that the nitrifying organisms were present and would accomplish their work to the stage of nitrates if given sufficient time.

The actual working of the Bio Aeration unit by continual flow and separation of sludge in the Dortmann tanks commenced early in November and the first results were very satisfactory. A fairly clear non putrescible effluent was obtained with the oxygen absorbed in four hours figure under 1 and the suspended matter about 3 parts per million. There was a difficulty at this time in keeping a regular flow. The quantity aimed at was 250,000 gallons a day but it was usually well under this figure. The quantity was then put up to about 500,000 gallons a day and the quality of the sludge deteriorated quickly and the appearance and chemical figures of the effluent began to go off. In my opinion a good deal of sludge was pumped away from the unit during this period which should have been retained. A badly conditioned sludge takes a long time to settle and as the method of determining it at the works is settlement for one hour in a graduated cylinder a large amount was pumped away as the reading was much higher than the standard to which they were working. If when these bad conditions arose, all the sludge had been reconditioned in the Aeration tank by paddling without the addition of further sewage the sludge would have ripened in a day or two and would have then be found to have been normal in quantity on settlement and the unit could have been put to work again at a normal rate. Instead of that, as a good deal of the carefully prepared sludge had been pumped to waste, the plant continued to work under unfavourable conditions. The sludge never became properly conditioned and although it acted fairly well when sewage was admitted at a slow rate when 250,000 gallons a day was tried the effluent was very unsatisfactory.

Since then the building up of a good nitrating sludge has been aimed at by continuous agitation and addition of sludge and humus and the starting up of the plant will be delayed until this has been accomplished.

I append some typical results obtained during the latter part of the year.

| | Results expressed in parts per 100,000 | |
|---------------------------------|--|----------------------|
| | Crude Sewage | Imhoff Tank Effluent |
| Free and Saline Ammonia .. | | |
| Albuminoid Ammonia | 6.01 | 4.83 |
| Oxygen absorbed in 3 minutes .. | 0.63 | 0.32 |
| Oxygen absorbed in 4 hours . .. | 3.96 | 2.27 |
| Nitrogen as Nitrites | Trace | Trace |
| Nitrogen as Nitrates | Absent | Absent |
| Reaction | Alkaline | Alkaline |
| Suspended Matter | 56.0 | 38.0 |
| Chlorine as Chlorides | 123.0 | 130.0 |

| Effluents. | Coral beds. | Granite beds. | Fall. |
|------------------------------|-------------|---------------|----------|
| Free and Saline Ammonia .. | 0.83 | 0.32 | 2.64 |
| Albuminoid Ammonia .. | 0.06 | 0.04 | 0.18 |
| Oxygen absorbed in 3 minutes | 0.32 | 0.29 | 1.12 |
| Oxygen absorbed in 4 hours . | 0.93 | 0.86 | 2.69 |
| Nitrogen as Nitrites .. | Excessive | Excessive | Trace |
| Nitrogen as Nitrates .. | 0.7 | 0.9 | 0.1 |
| Reaction .. | Alkaline | Alkaline | Alkaline |
| Suspended Matter .. | 3.6 | 3.0 | 12.8 |
| Chlorine as Chlorides .. | 129.0 | 134.0 | 136.0 |

| Bio Aeration Effluent. | A | B | C | D | E |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|
| Free & Saline Ammonia .. | 1.52 | 0.08 | 2.64 | 1.80 | 3.12 |
| Albuminoid Ammonia .. | 0.08 | 0.07 | 0.17 | 0.15 | 0.22 |
| Oxygen absorbed in 3 minutes .. | — | 0.46 | 0.30 | 0.50 | 0.65 |
| Oxygen absorbed in 4 hours .. | 1.67 | 1.25 | 0.92 | 1.21 | 1.38 |
| Nitrogen as Nitrites .. | Excessive | Excessive | Excessive | Excessive | Excessive |
| Nitrogen as Nitrates .. | 0.2 | 2.1 | 0.1 | 0.1 | 0.3 |
| Suspended Matter .. | 5.8 | 2.0 | 2.8 | 2.8 | 8.8 |
| Chlorine as Chlorides .. | 76.5 | 84.0 | 78.5 | 186.0 | 83.4 |

A. Taken on September 2nd Second day of Working.

B. „ „ „ 21st shows full nitration.

C. „ „ November 4th when unit started to work with Dortmann Tanks.

D. „ „ December 13th when effluent started to deteriorate.

E. „ „ December 21st when effluent was slightly putrescent.

SEWAGES EFFLUENTS ETC. FROM PRIVATE SEWAGE INSTALLATIONS.

542 samples were analysed and these consisted of samples of tank effluent delivered on to the coral beds and also samples of the purified effluent from the coral beds.

These installations have on the whole worked very well during the year and they have also been fairly well looked after. If insufficient care is taken to ensure the cleansing and removal of obstructions in the distributing apparatus, this is at once reflected in the character of the filtered effluent which becomes turbid and putrescible.

The de-sludging of sedimentation tanks is also an important point in the proper working of the plants and on several occasions I have recommended that this should be done.

The results from some of the installations which were first put in are not very satisfactory and this means I think the choking of the coral in the filtering tank by humus. These filtering tanks will shortly have to be emptied, cleaned out and the coral washed and put back.

MILKS FROM ITINERANT VENDORS.

290 samples were collected and handed to me for analysis.

Out of these 60 or 20.7% were adulterated. 58 or 20.% were adulterated by the addition of water and 2 or 0.7% were deficient in fat.

The following table shows the number of samples taken for the past ten years, the percentage adulterated and the average adulteration.

| Year. | Number. | Percentage Adulteration. | Average Adulteration. |
|-------|---------|-----------------------------|--------------------------|
| 1918 | 20 | 85.0 | 42.6 |
| 1919 | 396 | 26.8 | — |
| 1920 | 807 | 18.3 | 13.8 |
| 1921 | 728 | 18.1 | 9.2 |
| 1922 | 819 | 15.4 | 13.6 |
| 1923 | 534 | 18.7 | 14.3 |
| 1924 | 444 | 17.8 | 19.2 |
| 1925 | 319 | 24.6 | 15.1 |
| 1926 | 398 | 18.8 | 12.6 |
| 1927 | 290 | 20.0 | 14.5 |

The average adulteration for added water was 14.5% and the following table classifies the percentage adulterations by the addition of water for the year.

| | | |
|------------------------------------|----|----|
| Between 60% and 50% of added water | .. | 1 |
| „ 50% „ 40% „ „ | .. | 1 |
| „ 40% „ 30% „ „ | .. | 3 |
| „ 30% „ 20% „ „ | .. | 10 |
| „ 20% „ 10% „ „ | .. | 18 |
| „ 10% „ 4% „ „ | .. | 14 |
| Below 4% of added water | .. | 11 |

The deficiency in fat in both cases was 44.6%.

No other form of adulteration was detected.

TINNED MILK.

Sixty three samples were analysed. They were of the usual three varieties viz;— natural, condensed unsweetened, and condensed sweetened.

All the natural milks were up to the standards required by the Food and Drugs Ordinance.

In two brands of condensed milk the dilution clause was not properly stated. The vendors were warned that they must alter their labels and have them approved by the Colonial Secretary.

One firm sold condensed milk without a label. This was stopped immediately it was pointed out to them that their action was wrong.

MILK FOODS.

Eight samples were analysed and these were all infants foods. They did not contain any woody fibre or any mineral substance insoluble in acid.

One sample when diluted according to the instructions on the label gave a milk product which did not approximate to the composition of human milk. It was very low in fat. The importers were warned. They withdrew all stocks and exported the milk.

EMULSIFIED MILKS.

Eighteen samples were analysed and all save one were up to standard. In the one case the milk fat was slightly low and the vendors were warned.

CREAM.

Five samples were analysed. They were all single creams containing from 25 to 28% of milk fat.

No preservatives were found.

BUTTER.

Eight samples were analysed. All contained over 80% of milk fats and not more than 16% of water.

Boric acid was present in three of the samples but in all cases the amount present was under 0.5%

FLOUR.

Ten samples were analysed and were found to conform to our regulations.

TEA.

The eight samples analysed all conformed to our Regulations.

COFFEE.

The twelve samples analysed all conformed to our Regulations.

TINNED MEAT, FISH AND VEGETABLES.

Twenty two samples were examined.

All these goods were in good condition and poisonous metals in solution were absent.

AERATED WATER.

Seventeen samples were analysed and in all cases poisonous metals in solution were absent.

SUGAR.

Six samples of sugar were analysed and all were up to standard.

ALCOHOLIC LIQUORS.

Five samples of Brandy were analysed and all contained the requisite amount of Ethers.

Nine samples of Beer were analysed and all passed the Regulations.

QUININE TABLETS.

Four samples were analysed and were found to be correct.

SAMPLES FROM MUNICIPAL ENGINEER.

I analysed the following samples and sent in reports on the same.

| | | | |
|----------------------------|----|----|----|
| Stone Filled Sheet Asphalt | .. | .. | 36 |
| Granite Filler | .. | .. | 30 |
| Flux Oil | .. | .. | 1 |

SAMPLES FROM GAS ENGINEER.

I analysed the following samples—

| | | | |
|-------------|----|----|----|
| Coal | .. | .. | 8 |
| Coke | .. | .. | 2 |
| Creosote | .. | .. | 1 |
| Spent Oxide | .. | .. | 11 |

SAMPLES FROM ELECTRICAL ENGINEER.

I analysed the following samples—

| | | | |
|--------------|----|----|----|
| Coal | .. | .. | 70 |
| Benzine | .. | .. | 2 |
| Crude Oil | .. | .. | 2 |
| Battery Acid | .. | .. | 4 |
| Condensate | .. | .. | 27 |

SAMPLES FROM WATER ENGINEER.

I analysed the following samples—

| | | | |
|----------------|----|----|-----|
| Coal | .. | .. | 187 |
| Liquid Fuel | .. | .. | 2 |
| Burnt Lime | .. | .. | 2 |
| Special Waters | .. | .. | 12 |
| Water for Lead | .. | .. | 2 |

SAMPLES FOR BRIDGE ENGINEER.

I analysed the following samples—

| | | | |
|-------|----|----|---|
| Air | .. | .. | 1 |
| Water | .. | .. | 4 |

SAMPLES FOR SANITARY ENGINEER.

I analysed the following samples—

| | | | |
|-------------------|----|----|---|
| Earthenware Pipes | .. | .. | 2 |
| Bricks | .. | .. | 3 |

SAMPLES FROM BUILDING SURVEYOR.

I analysed the following samples—

| | | | |
|-------------------|----|----|---|
| Sand | .. | .. | 4 |
| Building Material | .. | .. | 2 |

SAMPLES FOR HEALTH DEPARTMENT.

I analysed the following samples—

| | | |
|---------------------------------|----|----|
| Water (for mosquito Department) | .. | 36 |
| Calculi | .. | 2 |
| Urines | .. | 9 |

ACTION OF WATER ON CONCRETE PIPES.

A comparison of the amount of inorganic matter in the Kallang River Reservoir water and the same water after it has passed through the concrete main, has been made by a number of tests throughout the year.

The tests show that the solvent action of the water on these pipes diminished fairly steadily throughout the year.

I have the honour to be,

Sir,

Your obedient servant,

A. G. HARRINGTON, F.I.C., F.C.S.,

Municipal Analyst.

Fifteenth Annual Report

of the

Municipal Bacteriological

Laboratory

Singapore

by

COLIN C. B. GILMOUR, M. A., M. B.

BACTERIOLOGICAL LABORATORY,

Singapore, 9th February, 1928.

To,

THE MUNICIPAL HEALTH OFFICER.

SIR,

I have the honour to forward the following report on the working of this department during the year 1927.

PUBLIC HEALTH EXAMINATIONS.

During the year 11,506 specimens were received for examination. This number far exceeds that of previous years.

MALARIA.

3,590 blood films were examined in 1,307 or 36.5 per cent of which the malaria parasite was found. This percentage is the same as that of last year. 426 were Subtertian, 872 Benign Tertian, 7 Quartan, and 2 mixed infections. Of the positive films 413 came from the Gunong Pulai water works, most of them from Pontian, 27 from Mandai Quarry, 519 from the Health Department, and 248 from Practitioners. There has been a great increase during the year in the number of blood films received from the health department nearly all of which are taken from our own coolies.

TUBERCULOSIS.

512 specimens of sputum, 2 of urine, 1 of faeces, 2 of pus and 8 of cerebro-spinal fluid were examined. The tubercle bacillus was demonstrated in 137 specimens of sputum and in 3 of the specimens of cerebro-spinal fluid. The remainder were negative. Three guinea pigs were inoculated 2 with sediment from sputum and 1 with cerebro-spinal fluid but in no case were any tubercular lesions produced.

TYPHOID AND PARATYPHOID FEVERS.

In this group 801 examinations were made. 48 specimens of serum gave a positive Widal Reaction with the *B. typhosus*, 19 with the *B. paratyphosus* A, and 2 with the *B. paratyphosus* B. 2 specimens gave a group reaction. 16 specimens of faeces, 2 of urine, and 3 of blood were examined but no bacilli of this group could be isolated in culture.

DYSENTERY.

Amoebic.—474 specimens were examined in 56 of which the *E. histolytica* or its cystic form was found.

Bacillary.—123 specimens were examined by culture, and *B. dysenteriae* (Flexner) isolated from 1 and *B. dysenteriae* (Hiss and Russell) isolated from 7. Endeavours were made to isolate a bacteriophage from 18 stools but no lytic action was observed on cultures of Shiga's bacillus or of Flexners. Some tubes of d'Herelles bacteriophage were obtained from Kuala Lumpur. It was found that this had a strong lytic action on Flexner's bacillus, a less strong action being observed with cultures of Shiga's bacillus.

CHOLERA.

69 specimens were examined from 36 of which the cholera vibrio was isolated in culture. The vibrio was isolated from cases of the disease in February, October, November and December. Endeavours were made to isolate a bacteriophage for the vibrios from the stools of convalescent cases at the Middleton Hospital but without success.

PLAGUE.

11 specimens of human origin were examined in 4 of which the *B. pestis* was demonstrated. Positive results were obtained in April and August. 1 rat and 1 guinea pig were inoculated with suspected plague material with negative results. In the latter case the material was derived from sores on the leg of a patient sent to the Middleton Hospital as a case of plague. At autopsy it was found that the patient was suffering from plague. At autopsy it was found that the patient was suffering from Pneumococcal Meningitis.

Rats.—4137 rats were examined none of which shewed any signs of infection with plague. No flea counts were done. The species of rats and their numbers are shewn in the following table:—

| Species. | Male. | Female. | Total. | Infected. |
|------------------------|-------|---------|--------|-----------|
| <i>R. decumanus</i> .. | 1,273 | 1,895 | 3,168 | — |
| <i>R. rattus</i> .. | 132 | 184 | 316 | — |
| <i>R. concolor</i> .. | 163 | 186 | 349 | — |
| <i>R. musculus</i> .. | — | — | 2 | — |
| <i>Crocidura</i> .. | — | — | 302 | — |
| Total .. | | — | 4,137 | — |

As in previous years it will be noted that *R. decumanus* is about 10 times as common as any other single species. I understand that the systematic trapping of rats has been stoppéd. Endeavours were made to isolate a bacteriophage from the faeces of 5 rats. One of them No. 20) shewed a slight lytic action on cultures of *B. pestis* derived from a case of plague in the Hospital but the cultures unfortunately died out before many experiments could be made.

CEREBRO-SPINAL FEVER.

48 specimens of cerebro-spinal fluid were examined in 25 of which the meningococcus was demonstrated.

DIPHTHERIA.

478 specimens were examined in 84 of which the Klebs Loeffler bacillus was demonstrated in culture. In connection with suspected cases 5 guinea pigs were inoculated but the cultures proved to be a virulent.

LEPROSY.

53 specimens were examined in 24 of which the B. leprae was found.

Miscellaneous included:—

53 specimens of urine for general examination.

| | | | |
|-----|--|---|---|
| 19 | „ | „ | urine for causative organisms. |
| 33 | „ | „ | pus for causative organisms. |
| 3 | „ | „ | pathological fluid for causative organisms. |
| 169 | „ | „ | pus for gonococci (53 + ve) |
| 16 | „ | „ | urine „ (7 + ve) |
| 7 | „ | „ | prostatic fluid „ (3 + ve) |
| 647 | „ | „ | faeces Ova (47 Anky. 94 Ascaris) |
| 2 | „ | „ | blood Weil Folix reaction (— ve) |
| 5 | „ | „ | serum Sp. pallida (2 + ve) |
| 1 | „ | „ | urine spirochaetes (— ve) |
| 1 | „ | „ | C. S. fluid total count |
| 1 | „ | „ | C. S. fluid pneumococci (+ ve) |
| 1 | „ | „ | sputum pneumococci (+ ve) |
| 1 | „ | „ | smear tetanus (—ve) |
| 8 | „ | „ | blood Anthrax (1 + ve) |
| 28 | specimens of blood typanosomes (3 + ve) | | |
| 19 | „ | „ | „ parasites (— ve) |
| 5 | „ | „ | „ microfilariae (— ve) |
| 9 | „ | „ | „ differential count |
| 4 | „ | „ | „ pasteurellae |
| 1 | „ | „ | hair ringworm (+ ve) |
| 1 | „ | „ | faeces mucus |
| 3 | „ | „ | faeces coccidia |
| 1 | „ | „ | water |
| 4 | „ | „ | disinfectant |
| 121 | „ | „ | milk |
| 1 | „ | „ | brawn |
| 1 | „ | „ | preserved pork |
| 4 | „ | „ | tumors |
| 2 | „ | „ | tapeworms |
| 13 | „ | „ | fleas |
| 11 | „ | „ | soda-water |
| 1 | batch of mosquitoes | | |
| 1 | batch of mosquito larvae. | | |

DISINFECTANTS.

These were tested both by the usual "Rideal-Walker" method and also by a modification of the Admiralty Method. One sample failed to kill the *B. typhosus* in 10 minutes and the others had coeffs varying from 1 to 10. That determined by the Admiralty method was usually half of that found by the Rideal Walker.

MILK.

121 samples were tested by the Methylene Blue test of which I was shewn to be Grade I, 8 were in Grade II, 63 in Grade III, and 49 in Grade IV. All the samples were of "fresh milk" taken from vendors in town and the results are a very slight improvement on those of last year. A total count made on one sample gave 15 million colonies per c.c. and faecal organisms were present in 0.0001 c.c.

FOOD.

1 sample of Brawn and 1 of preserved pork were examined but no pathogenic organisms found. The brawn was fed to 2 rats which shewed no sign of ill health after feeding on it.

The preserved pork was found to contain a few sporing aerobes.

PASTEURELLA.

The Government Veterinary Surgeon submitted specimens for organisms of this group. What at first appeared to be bipolar staining bacilli were easily isolated but on inoculation into guinea pigs were proved to be non-pathogenic.

SODA WATER.

11 specimens of Soda-water were examined of which 10 contained no faecal organisms in 100 c.c. and the highest count in these 10 was 60 colonies per c.c., the lowest 4. The remaining sample had lactose fermenters in 100 c.c. but not in 10 and the total count was 166.

2. WATER.

7,490 samples of Municipal Water were examined during the year. As in previous years the examination consisted of (a) An estimation of the total number of colonies per c.c. growing on agar at 37° C. (b) An estimation of the smallest amount of the sample in which lactose fermenting organisms were present (c) Isolation and study of the organisms in (b).

The results obtained during the year have been very satisfactory and fully up to the Home Standard.

A.

The average number of colonies per c.c. was in—

| | | | | |
|-----------------------|----|----|----|-------|
| Johore Main Water | .. | .. | .. | 600 |
| Seletar Reservoir | .. | .. | .. | 1,200 |
| Mc. Ritchio Reservoir | .. | .. | .. | 120 |
| Pierce Reservoir | .. | .. | .. | 115 |
| Bukit Timah Raw Water | .. | .. | .. | 475 |
| Mount Emily | .. | .. | .. | 220 |
| Pearls Hill | .. | .. | .. | 230 |
| Laboratory Tap | .. | .. | .. | 80 |

These results do not differ much from those of previous years. Some improvement has taken place in the Seletar water and the others

regarded as lake water may be considered fair. Of course great differences in counts often occur in 48 hours. The relatively high count in the Johore Main water is due to some very high counts obtained when it was first taken into use in July.

B.

The water supplied to Consumers during the year has been kept up to the home standard and in 92 per cent of the samples taken from the laboratory tap no lactose fermenters were present in 100 c.c.s. In no case were they ever present in less than 10 c.c.s. and that only in 2 per cent of samples.

These results are equal to the best obtained at home and prove that a water of a very high degree of purity has been consistently supplied during the year.

The following table shews the percentages of samples containing lactose fermenters expressed to the nearest whole numbers.

| Source | Times examined | No faecal organisms in 100 c.c. | LACTOSE FERMENTERS PRESENT IN | | | | | |
|-----------------------|----------------|---------------------------------|-------------------------------|-------|------|--------|---------|----------|
| | | | 100 cc | 10 cc | 1 cc | 0.1 cc | 0.01 cc | 0.001 cc |
| Johore Main .. | 123 | 27 | 73 | 54 | 40 | 24 | 17 | 10 |
| Seletar .. | 158 | 2 | 98 | 76 | 28 | 11 | 3 | .. |
| Pierce Reservoir .. | 241 | 2 | 98 | 72 | 16 | 4 | .. | .. |
| Mac Ritchie Reservoir | 241 | 1 | 99 | 78 | 17 | 4 | .. | .. |
| Bukit Timah .. | 170 | 4 | 96 | 61 | 20 | 8 | .. | .. |
| Mount Emily .. | 115 | 5 | 95 | 70 | 18 | 1 | .. | .. |
| Pearls Hill .. | 238 | 10 | 90 | 36 | 3 | .. | .. | .. |
| Tap .. | 241 | 92 | 8 | 2 | .. | .. | .. | .. |

Special attention was paid to the streams entering the reservoirs during the year particularly those supplying Mac Ritchie Reservoir with a view to detecting any contamination from the Golf course. The results which are tabulated below shew that the streams are on the whole good and free from any gross contamination. It will be noticed that stream 1-A at Mc. Ritchie Reservoir which is stream 1, below the Golf Course is tion as occurs is intermittent. The tables also shew that while there is the worst though it cannot be called highly polluted and such contamination very little difference between the waters of Pierce and Mac Ritchie Reservoirs the streams feeding them differ greatly, those at the latter reservoir being subject to greater changes as regards numbers of lactose fermenters, while of Pierce Reservoir the numbers are more constant.

The final result however is the same, the Reservoir waters giving almost identical results:—

STREAM WATERS.

| SOURCE | | | LACTOSE FERMENTERS PER CENT. | | | | | | | | | |
|--------------------|---|----|------------------------------|----------|----------|---------|--------|----------|-----------|------------|----|----|
| | | | Total colonies | — 100 | + 100 | + 10 | + 1 | + 0.1 | + 0.01 | + 0.001 | | |
| Mac Ritchie Stream | 1 | .. | 425 | 35 | 65 | 55 | 35 | 13 | 5 | .. | | |
| " | " | " | 1A | .. | 17 | 83 | 73 | 68 | 47 | 21 | .. | |
| " | " | " | 2 | .. | 70 | 67 | 33 | 4 | 4 | 3 | 1 | .. |
| " | " | " | 3 | .. | 130 | 70 | 30 | 10 | 4 | 3 | .. | .. |
| " | " | " | 4 | .. | 80 | 61 | 39 | 16 | 4 | .. | .. | .. |
| " | " | " | 5 | .. | 130 | 48 | 52 | 31 | 13 | .. | .. | .. |
| " | " | " | 6 | .. | 100 | 48 | 52 | 32 | 4 | .. | .. | .. |
| " | " | " | 7 | .. | 65 | 35 | 65 | 30 | 6 | .. | .. | .. |
| " | " | " | 8 | .. | 85 | 48 | 52 | 24 | .. | .. | .. | .. |
| " | " | " | 9 | .. | 300 | 38 | 62 | 16 | 4 | .. | .. | .. |
| " | " | " | 10 | .. | 150 | 17 | 83 | 57 | 34 | 21 | 4 | .. |
| " | " | " | 11 | .. | 200 | 33 | 67 | 56 | 38 | 23 | 8 | .. |
| " | " | " | 12 | .. | 200 | 39 | 61 | 39 | 17 | 4 | .. | .. |
| " | " | " | 13 | .. | 175 | 19 | 81 | 61 | 42 | 28 | 14 | .. |
| Pierce Stream | 1 | .. | 90 | .. | 100 | 63 | .. | .. | .. | .. | .. | .. |
| " | " | " | 2 | .. | 220 | 6 | 94 | 83 | 18 | 6 | .. | .. |
| " | " | " | 3 | .. | 200 | 7 | 93 | 72 | 28 | 7 | .. | .. |
| " | " | " | 4 | .. | 130 | .. | 100 | 77 | 36 | 7 | .. | .. |
| " | " | " | 5 | .. | 120 | 7 | 93 | 71 | .. | .. | .. | .. |
| " | " | " | 6 | .. | 110 | .. | 100 | 80 | 20 | 7 | .. | .. |
| " | " | " | 7 | .. | 90 | .. | 100 | 59 | 18 | .. | .. | .. |
| " | " | " | 8 | .. | 140 | .. | 100 | 87 | 12 | 6 | .. | .. |
| " | " | " | 9 | .. | 100 | 7 | 93 | 73 | 13 | .. | .. | .. |
| " | " | " | 10 | .. | 130 | .. | 100 | 77 | 12 | 6 | .. | .. |
| " | " | " | 11 | .. | 100 | 7 | 93 | 53 | 7 | .. | .. | .. |
| " | " | " | 12 | .. | 85 | 7 | 93 | 47 | 14 | .. | .. | .. |
| " | " | " | 13 | .. | 120 | .. | 100 | 55 | 16 | .. | .. | .. |
| " | " | " | 14 | .. | 100 | 14 | 86 | 66 | 20 | .. | .. | .. |
| " | " | " | 15 | .. | 120 | .. | 100 | 75 | 12 | 6 | .. | .. |

In addition to these waters samples were examined from each filter in use every day. These tests were made chiefly for the purpose of controlling the running of the filters and it is unnecessary to detail them. No unfiltered water was supplied to consumers during the year.

C.

The objects of the isolation and study of organisms from the lactose peptone water tubes are first to estimate the purity of the waters forming the supply as regards faecal contamination and second to detect any alterations in waters already treated or undergoing treatment. For this purpose we make use of the results of Clemesha's work (1) by which organisms of faecal origin are classed according to their powers of resistance to the purifying agencies of sun, air and time. If faecal organisms of the very feebly resistant class (Class I) are present it is

probable that contamination has occurred very recently or may be actually occurring while if only the very resistant organisms (Class III) are present it may be presumed that any contamination is of old and that any pathogenic organisms added at that time have died out, for it is well known that as a rule pathogenic organisms do not tend to multiply or persist long in the waters under natural conditions. During the year 315 colonies were studied and classified of which only 12 belonged to the susceptible class (Class I). Of these II were *B. coli communis* (Eserich) and I *B. oxytocus perniciosus* (Wyssek). These were isolated from samples taken at Filter 7 Woodleigh on 14th March, Filter 6 Woodleigh on 2nd May, and Filter 3 at Bukit Timah on 13th June, and were undoubtedly due to local contamination of the sample. *B. coli communis* was also found in Johore Main water on 30th June when lactose fermenters were present in 0.001 c.c. and in Streams 13 and 1A at Mac. Ritchie Reservoir with faecal organisms present in 0.01 c.c. The contamination in the Johore Main was due to the pipes being newly laid and the water very rapidly improved. Nitrites were found in the Johore Sample by the Analyst but in none of the others.

The discovery of some means of determining whether lactose fermenters are of faecal origin or not is being continually sought though in view of what is known of the alterations that take place in a water through natural purifying agencies it would not appear to be of very great importance. Recently Taylor and Martin (2) have, by combining the results of the Sod. Citrate Test, Methyl Red Test and Voges proskauer reaction, arrived at a series of formulae which they claim to be of great help in determining whether organisms are of faecal origin or not. The formulae are as follows:—

| Formula. | Sodium Citrate. | Methyl Red. | Voges Proskaver. |
|----------|-----------------|-------------|------------------|
| 1 | — | + | — |
| 2 | + | — | + |
| 3 | + | + | — |
| 4 | + | — | — |
| 5 | + | + | + |
| 6 | — | — | — |

These formulae are read from Left to Right so that Formula 1 is — + —, 2 is + — + etc., The most important are Nos. 1 and 2. No. 1 is held to be indicative of pollution and No. 2 of safety. The formulae of 275 colonies were obtained and at the same time their sugar reactions were studied. Altogether 10 colonies belonged to Class 1 and 94 gave formula 1 so that nine times as many colonies were condemned by Taylor and Martins Test as were condemned by Clemeshas. Of the 94 colonies whose formula was — + — 69 were *B. paragruntal*. This organism would appear to be the *B. gruntal* classified by Clemesha as Class III differing from it only in being able to ferment maltose. In no case during the last 5 years has a *Bacillus* giving the reactions of *B. gruntal* been isolated from water in this laboratory which failed to ferment maltose. It seems to me that while these tests are of great assistance yet they condemn waters known to be safe when relied on too exclusively and that we must base our opinion as to the safety of a

water not on the presence of bacilli diagnosed as " faecal " by the results of certain tests but on the presence of bacilli known to occur in faeces but shewn to be incapable of long life or multiplication in waters under natural condition of air and light . The following are details of the colonies examined.

GUNONG PULAI AND JOHORE WATERS.

Samples 6 Colonies Studied 30.

| | | | | |
|--------------|------------|---------|---|--------------|
| Class 1 | 4 colonies | Formula | 1 | 16 colonies. |
| Class II | 3 | " | 2 | 5 " |
| Class III | 10 | " | 3 | 1 " |
| Unclassified | 13 | " | 4 | 0 " |
| | | Formula | 5 | 7 " |
| | | Formula | 6 | 1 " |

Organism causing preponderance of Formula 1 B. paragruntal 10 colonies.

STREAMS AT MC. RITCHIE RESERVOIR.

Samples 9 colonies 45.

| | | | | |
|--------------|------------|---------|---|--------------|
| Class I | 2 colonies | Formula | 1 | 29 colonies. |
| Class II | 16 | " | 2 | 3 " |
| Class III | 19 | " | 3 | 8 " |
| Unclassified | 8 | " | 4 | 0 " |
| | | Formula | 5 | 5 " |
| | | Formula | 6 | 0 " |

Organism causing preponderance of Formula 1 B. paragruntal 20 colonies.

MAC RITCHIE RESERVOIR.

Samples 3 colonies 15.

| | | | | |
|--------------|------------|---------|---|-------------|
| Class I | 0 colonies | Formula | 1 | 4 colonies. |
| Class II | 9 | " | 2 | 0 " |
| Class III | 3 | " | 3 | 3 " |
| Unclassified | 3 | " | 4 | 5 " |
| | | Formula | 5 | 0 " |
| | | Formula | 6 | 3 " |

B. Paragruntal 3.

BUKIT TIMAH FILTERS AND CLEAR WATER TANK.

Samples 26 colonies 130.

| | | | | |
|--------------|------------|---------|---|--------------|
| Class I | 1 colonies | Formula | 1 | 18 colonies. |
| Class II | 43 | " | 2 | 38 " |
| Class III | 33 | " | 3 | 25 " |
| Unclassified | 53 | " | 4 | 18 " |
| | | Formula | 5 | 30 " |
| | | Formula | 6 | 1 " |

B. Paragrunthal 15.**WOODLEIGH FILTERS.**

Samples 6 colonies 30.

| | | | | |
|-----------|------------|---------|---|--------------|
| Class I | 3 colonies | Formula | 1 | 18 colonies. |
| Class II | 4 | " | 2 | 2 " |
| Class III | 18 | " | 3 | 4 " |
| Unclassed | 5 | " | 4 | 2 " |
| | | Formula | 5 | 3 " |
| | | Formula | 6 | 1 " |

B. Paragrunthal 15.**MISCELLANEOUS SAMPLES.**

Samples 3 colonies 20.

| | | | | |
|-----------|------------|---------|---|-------------|
| Class I | 0 colonies | Formula | 1 | 7 colonies. |
| Class II | 9 | " | 2 | 7 " |
| Class III | 9 | " | 3 | 1 " |
| Unclassed | 2 | " | 4 | 1 " |
| | | Formula | 5 | 4 " |
| | | Formula | 6 | 0 " |

B. Paragrunthal 6.

In addition to the routine samples 24 samples of chlorinated water from Mandai Quarry were examined, the results of which were exceedingly good 6 samples from Sandakan, 2 from Johore, and 4 special samples of water from different parts of the town were examined. The last 4 shewed the water to be of the same standard as in the laboratory tap.

3. SEWAGE.

In the early part of the year a few experiments were done to try and explain the good results following on chlorination. Sewage being a very complex and varying product and containing enormous number of micro organisms experiments were confined to observing the effect of the chlorine on Nitrogen. Tubes of Giltays solution were inoculated with sewage from (a) the Imhoff tank i. e. before Chlorination, (b) the sprinkler arms i. e. after chlorination (c) the effluent from the filter beds. It was noted that vigorous frothing took place in (a) within 24 hours shewing a rapid and vigorous growth of denitrifying bacteria. In (b) frothing was always delayed for 48 hours and was less than in (a) while in (c) no frothing was ever observed. Media were also inoculated with a view to observing any difference in Nitrate and Nitrite production but no very definite results were obtained.

Later in the year a plant for the treatment of sewage by activated sludge was installed at Alexandra Road. Samples of the sludge have been examined almost daily by the microscope as to the numbers and species of protozoa and other life present. The effluent has also been examined bacteriologically and compared with that of the filter beds. The comparatively small numbers of bacteria in the bioaeration effluent as compared with that of the filter beds is striking there being usually 2 to 4 times as many bacteria per c. c. in the latter as in the former. In November the average number of bacteria was 25,000 in the bioaeration unit and 90,000 in the filter effluent while in December it was 60,000

against 207,000. It is not possible to say what relation the various forms of protozoal life bear to the results obtained in the purifying of the sewage but it has been observed that a falling off in the efficiency of the plant coincided with a gradual disappearance of the higher types of protozoa and the development of vast masses of sulphur bacteria.

4. MORTUARY.

16 postmortem examinations were made during the year the causes of death being—

| | | | | |
|---------------------------|----|----|----|---|
| Cholera | .. | .. | .. | 3 |
| Gastro-Enteritis | .. | .. | .. | 2 |
| Bubonic Plague | .. | .. | .. | 1 |
| Small-pox | .. | .. | .. | 1 |
| Cerebro-spinal Meningitis | .. | .. | .. | 1 |
| Measles | .. | .. | .. | 1 |
| Amoebic Dysentery | .. | .. | .. | 1 |
| Colitis | .. | .. | .. | 1 |
| Tubercular Enteritis | .. | .. | .. | 1 |
| Tubercular Meningitis | .. | .. | .. | 1 |
| Pneumococcal Meningitis | .. | .. | .. | 1 |
| Pulmonary Oedema | .. | .. | .. | 1 |
| Syphilis | .. | .. | .. | 1 |

My assistants Mr. Chin Chin Fong and Mr. Loo Cheng Swee have worked with great keenness and efficiency during the year and Dr. Thurai has given considerable help in the examination of blood films from the sick under his charge.

I have the honour to be,

Sir,

Your obedient servant,

C. C. B. GILMOUR, M.A., M.B.,

Municipal Bacteriologist.

- (1) Clemesha. The Bacteriology of Surface Waters in the Tropics, 1912.
- (2) Taylor, Martin and Rao Naidu. A comparison of the results of Clemesha's method and the test of Citrate Utilization as applied to water supplies in Burma *Ind. Jour. Med. Res.* Vol. XIV April, p. 801.

(65-D)

MIDDLETON HOSPITAL,
Singapore, 4th February, 1928.

To

THE MUNICIPAL HEALTH OFFICER.

SIR,

I have the honour to present the annual report for the Middleton Hospital for the year 1927.

The following table gives a summary of cases treated during the year.

| Disease | Remaining from 1926 | Admitted | Discharged | Died | Remaining |
|----------------------------|------------------------|----------|------------|------|-----------|
| Smallpox | 12 | 16 | 23 | 4 | 1 |
| Cholera | 4 | 20 | 8 | 4 | 12 |
| Plague | — | 2 | 1 | 1 | — |
| Chickenpox | 7 | 180 | 176 | — | 11 |
| Measles | 1 | 69 | 65 | 4 | 1 |
| Diphtheria | 2 | 16 | 14 | 3 | 1 |
| Cerebro-Spinal Fever | — | 14 | 4 | 9 | 1 |
| Erysipelas | 1 | 3 | 4 | — | — |
| Whooping Cough | — | 4 | 3 | 1 | — |
| Mumps | 1 | 79 | 76 | 1 | 3 |
| Under Observation | 4 | 42 | 46 | — | — |
| German Measles | 1 | 18 | 19 | — | — |
| Puerperal Fever | — | 1 | 1 | — | — |
| Para Typhoid | — | 1 | 1 | — | — |
| Other Diseases | — | 52 | 45 | 7 | — |
| TOTAL .. | 33 | 517 | 486 | 34 | 30 |

At the end of 1926 33 patients remained in Hospital via:—12 Smallpox, 4 Cholera, 7 Chickenpox, 1 Measles, 2 Diphtheria, 1 Erysipelas, 1 Mumps, 1 German Measles, and 4 Contacts.

During the year there were 517 admissions.

1. **Other diseases.**—52 cases admitted for observation, or said to be suffering from one of the notifiable infectious diseases were found to be suffering from the following diseases:—7 Dermatitis, 2 Boils, 7 Syphilis, 1 Abscess, 1 Herpes Zoster, 1 Scurvy, 3 Dengue, 5 Tonsillitis, 1 Asthma, 1 Laryngitis, 2 Diarrhoea, 1 Colitis, 1 Gastro-enteritis, 1 Parotitis, 2 Tubercular Meningitis, 1 Pneumococcal Meningitis, 1 Hemiplegia, 8 Malaria, 2 Pyrexia of unknown origin, 1 Coryza, 1 Tetanus, 1 Adenitis, 1 Septicaemia.

In this series there were 7 deaths viz. 1 Syphilis, 1 Laryngitis, 1 Gastro Enteritis, 2 Tubercular Meningitis, 1 Colitis, 1 Pneumococcal Meningitis. The remainder were discharged or transferred to other hospitals.

2. **Observation.**—46 contacts were kept in Hospital for 1 or more days.

3. **Diphtheria.**—16 cases were admitted and 2 remained from last year a total of 18. Of these 14 recovered, 3 died and 1 remained in Hospital at the end of the year.

9 cases were of the Laryngeal type, 3 necessitating tracheotomy of whom 1 died after operation, 2 laryngeal cases died upon whom tracheotomy was not done.

4. **Smallpox.**—16 cases were admitted and 12 remained from last year. Of these 28 4 died, 23 were discharged and 1 remained at the end of the year. 14 cases were of the discrete type, 11 Confluent, and 2 Haemorrhagic. 14 of the discrete type and 6 of the confluent type had been vaccinated. The others were unvaccinated.

5. **Chickenpox.**—180 cases were admitted during the year 143 of which were adult Tamils nearly all of them our own coolies.

6. **Cerebro-spinal Fever.**—14 cases were admitted during the year of which 4 were discharged, 9 died and 1 remained at the end of the year.

7. **Cholera.**—20 cases were admitted and 4 remained from 1926 a total of 24 of whom 8 were discharged, 4 died, and 12 remained at the end of the year.

The following table shows the admissions to the Hospital during the past 10 years.

| Disease | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 |
|-------------------------|------|------|------|------|------|------|------|------|------|------|
| Cholera | ... | 45 | 8 | ... | ... | ... | 5 | ... | 16 | 20 |
| Small Pox | 10 | 11 | 3 | 139 | 248 | 2 | 8 | 9 | 30 | 16 |
| Plague | 66 | 7 | 30 | 16 | 20 | 29 | 11 | 21 | 1 | 2 |
| Chickenpox | 28 | 18 | 39 | 98 | 103 | 172 | 210 | 277 | 155 | 180 |
| Diphtheria | 1 | 2 | 15 | 20 | 13 | 18 | 17 | 32 | 25 | 16 |
| Cerebro-spinal Fever .. | ... | 14 | 27 | 57 | 29 | 6 | 13 | 7 | 6 | 14 |
| Influenza | 70 | 23 | 14 | 5 | 1 | ... | ... | ... | ... | ... |
| Measles | ... | ... | ... | 39 | 23 | 20 | 29 | 49 | 70 | 69 |
| Erysipelas | ... | ... | ... | 9 | 3 | 8 | 5 | 2 | 11 | 3 |
| Mumps | ... | ... | ... | 25 | ... | 6 | ... | 27 | 47 | 79 |
| Whooping Cough | ... | ... | ... | 1 | ... | 1 | ... | 1 | 6 | 4 |
| Para Typhoid | ... | ... | ... | 1 | ... | 1 | ... | 1 | 3 | 1 |
| Pulmonary Tuberculosis | ... | ... | ... | 5 | 4 | 2 | ... | 1 | 1 | ... |
| German Measles | ... | ... | ... | ... | 1 | ... | 21 | 7 | 3 | 18 |
| Scarlet Fever | ... | ... | ... | ... | 1 | ... | ... | ... | 1 | ... |
| Observation | ... | ... | ... | ... | ... | ... | ... | 19 | 18 | 42 |
| Other Diseases | 34 | 55 | 46 | 61 | 58 | 15 | 41 | 17 | 32 | 52 |
| Puerperal Fever | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| | 209 | 175 | 182 | 476 | 504 | 282 | 361 | 473 | 425 | 517 |

I took 12 days local leave in September during which time Dr. Thurai acted for me.

The Hospital was visited during the year by Col. Needham while on a tour of inspection for the General Medical Council, and also by the Health Commissioner for Chicago. Students from the Medical College received clinical instruction in Infectious diseases in two courses during the year in the Hospital.

I have the honour to be,

Sir,

Your obedient servant,

C. C. B. GILMOUR, M.A., M.B.,
Medical Superintendent,
Middleton Hospital.

Singapore, 13th March, 1928.

To

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to forward the following report on anti-mosquito measures carried out in the Municipal Area during the year 1927.

ANTI-MALARIAL WORKS.

New permanent works were carried out in the following areas:—

- (1) Kampong Bahru Road—Western Reclamation.
- (2) Outram Road—Ice factory ravine.
- (3) Target Road—St. Michael's Road Area.
- (4) Adams Road Area.
- (5) Stamford Road Area.
- (6) Holland Park No 3, Area.
- (7) Tanjong Rhu Area.
- (8) Orange Grove Road Area.

(1) KAMPONG BAHRU ROAD—WESTERN RECLAMATION.

This area comprises the flat land between Spottiswoode Park and Kampong Bahru Road, and extends from Blair Road to Nelson Road. This area was formerly drained by open earth ditches. The main earth ditches were replaced by concrete channels of the anti-malarial type. 1189 lineal feet of 12 inch channel drain and 1,288 feet of 21 inch channel drain with concrete slab revetments were laid. 113 feet of miscellaneous channelling was also laid to connect up sullage drainage to the main drains.

(2) OUTRAM ROAD—ICE FACTORY RAVINE.

This is a short ravine on the slopes of Pearl's Hill behind the ice factory in Outram Road. Dangerous anopheline mosquitos have been found breeding on several occasions in seepages in the ravine. A large pond had been dug in the floor of the ravine to supply water to the factory engine.

The ravine was cleared of trees and undergrowth, the pond was filled in and 250 eight inch subsoil pipes and 103 twelve inch concrete inverts were laid to deal with the drainage of the ravine.

(3) TARGET ROAD AREA.

This area embraces the low lying land bounded by Balestier Road, Kim Keat Road, Serangoon Road and the Sungei Whampoe. Various species of anopheline mosquitos were common in this area and *A. ludlowi* was frequently found in the ponds adjacent to tidal waters.

229 ponds were dewatered by breaking down the bunds and cutting main earth drains. Clearing of undergrowth was carried out over the whole area and all existing earth drains were cleared and regraded.

(4) ADAMS ROAD AREA.

This area embraces all the ravines converging to Adams Road and draining into the Bukit Timah Canal by the stream running parallel to Adams Road. Many breeding places of *A. maculatus* were found in seepages in these ravines.

Notices were served on all owners requiring them to clear the floors of the ravines of all trees and undergrowth, to fill all ponds and wells, and to construct the drains necessary for the effective drainage of the area.

Arrangements were made with the Bukit Timah Rubber Estate and the Rural Health Officer to enable us to carry out the necessary work in these portions of the ravines which extend beyond the municipal boundary.

Main earth ditches were cut for a distance of 205 chains. Thirty ponds and six wells were filled in and the ravine floors were levelled. 940 trees were removed from the ravines. Work is still in progress.

(5) STAMFORD ROAD AREA.

The larvae of *A. Karwari* were found on several occasions in a seepage on the canal bank opposite the Raffles School Recreation ground. This seepage was dispersed by laying 115 five inch subsoil pipes discharging into the canal below high tide level.

(6) HOLLAND PARK AREA NO. 3.

This area is a strip of low lying land below the hill on the South side of Holland Road at the municipal boundary. This low land was full of seepages from the hill and the larvae of *A. maculatus* were found here on several occasions.

A deep contour drain was cut along the foot of the hill for a distance of 1,690 feet and led into the roadside drain in Holland Road.

(7) TANJONG RHU AREA.

A small area of mangrove swamp on the Swimming Club property, a breeding place of *A. ludlowi*, was cleared of mangrove. A small portion of the area was lagooned and the lower ground filled with the spoil from the lagoon.

145 eight inch subsoil pipes were laid to drain a marshy patch of ground behind the clubhouse.

(8) ORANGE GROVE ROAD AREA.

The larvae of *A. maculatus* were found in a persistent seepage round the tennis court of 21B Orange Grove Road.

263 five inch subsoil pipes were laid to drain this area.

MAINTENANCE OF EXISTING WORKS.

Extensions and repairs to existing areas were carried out at:—

WATTEN ESTATE AREA.

The subsoil pipes in the main ravine which were corroded were taken up and replaced by an open concrete Channel and the existing channel in the lower part of the ravine was relaid at a lower level.

704 lineal feet of 18 inch concrete channel with slab revetment were laid and 140 feet of 18 inch concrete channel without revetment.

HOLLAND ROADSIDE AREA.

The subsoil pipes in this area were taken up and replaced by a 12 inch concrete channel. 2,343 feet of 12 inch inverts were laid. Three

existing culverts under Holland Road were reconstructed and 58 feet of 21 inch concrete channelling was laid to connect these culverts to the main anti-malarial drain on the opposite side of the road.

CHANDU FACTORY RAVINE.

The old bathing place in the floor of this ravine was closed and the subsoil pipes below the sump supplying water to the Chandu Factory were taken up and replaced by 200 feet of 18 inch concrete inverts with 15" x 15" revetment slabs. A new culvert was constructed under the approach road to the Admiralty Oil Fuel Depot.

HOLLAND PARK RAVINE No. 2.

The subsoil pipes at the head of this ravine were taken up and replaced by an 18" concrete channel drain with concrete revetment slabs over a distance of 492 feet.

GROVE ROAD—GEYLANG ROAD AREA.

The work in this area was completed during the earlier part of the year. The completed bund is 1-mile 109 yards. Eight tidal gates open through the bund. The existing drains from Lorong 2 to Lorong 32 were deepened and led into the main earth drain behind the bund thence to discharge through the tidal gate.

HARBOUR BOARD RESERVOIR RAVINE.

The floor of the ravine below the reservoir was thoroughly cleared as far as Telok Blangah Road. The main stream was regraded and the existing earth drain replaced by an open concrete channel with slab revetment. 983 feet of 21 inch inverts, 67 feet of 18 inch inverts and 145 feet of 12 inch inverts were laid.

A small auxiliary reservoir below the main reservoir was filled in and drained by subsoil pipes.

50 four inch pipes and 300 eight inch pipes were laid.

WAYANG SATU AREA.

Central ditches were cut in the three ravines below Mount Rosie, the water from the ponds was released, and the pond bunds were levelled off. 3,668 yards of main drain were cut.

CLAYMORE DRIVE AREA.

This area embraces a small ravine draining to the roadside drain in Orchard Road just below Claymore Drive. The existing earth channel was diverted to suit the layout of the property and replaced by an 18 inch concrete channel with slab revetments for a distance of 744 feet. One Hume Pipe culvert was constructed under the reserve road for a distance of 40 feet.

The head of the ravine was cleared of trees and undergrowth and a few seepages and an old well were drained by subsoil pipes to the main concrete channel.

JALAN BESAR—LAVENDER STREET AREA.

To facilitate filling operations two tidal gates were constructed in this area, one at the culvert under Lavender Street and the other in the stream close to its entrance into the Rochore Canal. The greater portion of the filling of this area has been completed.

HOLLAND ROAD AREA No. 1

At the head of the ravine, two lines of subsoil pipes taking the sullage drainage of syce's quarters were taken up and replaced by 9 inch concrete invert drains for a distance of 265 feet.

SWETTENHAM ROAD AREA.

The work of channelling this area was put in hand. The floor of the ravine was cleared of rubber trees and undergrowth.

1,146 feet of subsidiary drain were cut and 400 eight inch subsoil pipes laid.

1,915 lineal feet of 21 inch concrete channel drain were constructed. Work is in progress.

CLUNY RAVINE.

A section of the anti-malarial drain in the lower part of the ravine which was in very bad repair was taken up and relaid. Advantage was taken of the new deep drain through Raffles College grounds to relay at a lower level. The culverts under the approach roads crossing the drain were enlarged.

600 feet of concrete drain with slab revetments was reconstructed and two Hume Pipe culverts were laid.

Work is in progress.

THOMPSON ROAD—MOULMEIN ROAD AREA.

An inadequate culvert crossing Moulmein Road was enlarged and reconstructed at a lower level.

The main earth drain traversing the ravine leading from this culvert to the Teochew Cemetery was subsequently replaced by a concrete channel drain with slab revetments for a distance of 1,705 feet.

MINOR REPAIRS AND EXTENSIONS TO EXISTING DRAINS.

Small extensions were made to deal with dangerous mosquito breeding grounds at:—

Kampong Bahru Road, Fort Canning, Nassim Road, Mount Rosie, Tanglin Barracks, Moulmein Road, Jervois Road No. 1, Radin Mas, Mosque Ravine, Wishart Ravine, Balestier Road, Kampong Java Area, Swiss Cottage No. 1, Rochalie Drive, Tanglin Road, Balestier Road Ravine, Outram Road, Morse Ravine, Cluny Ravine, Nassim and Dalvey Road Area, Napier Road, Orchard Road No. 1, Orchard Road No. 2, Woodleigh Filter Beds, Jervois Road No. 2, River Valley Road, Fernhill Area, Glencaird Area, One Tree Hill, Watten Estate, King's Road and Anderson Road.

The following materials were used for the work carried out in these areas:—

| | | | |
|--------------------------|----|----|-------|
| 18 inch concrete inverts | .. | .. | 150 |
| 12 inch concrete inverts | .. | .. | 1,680 |
| 9 inch concrete inverts | .. | .. | 100 |
| Concrete revetment slabs | .. | .. | 150 |
| 8 inch subsoil pipes | .. | .. | 9,200 |
| 5 inch subsoil pipes | .. | .. | 5,500 |

MAINTENANCE.

Routine maintenance was carried out over the following areas:—

Anderson Road, Barker Road, Claymore Drive, Bukit Timah Road, Cluny Ravine, Cuppage Road, Glencaird, Kings Road, Nassim and Dalvey

Roads, Nassim Road, Fernhill Area, Paterson Road, Scotts Road, Stevens Road, Woodleigh Filter Beds, Watten Estate, Tyersal Area, Chandu Factory Ravine, Hammer & Co. Ravine, S. H. B. Ravine, Jervois Road No. 1, Jervois Road, No. 2, Jervois Road Earth drains, Keith's Swamp, Kampong Bahru, Bukit Permai and Silat Road, Kampong Bahru Western Reclamation, Bushey Park, Leonie Hill, Morse Road Ravine, Mosque Ravine, One Tree Hill, Orchard Road No. 1, Orchard Road No. 2, Orchard Road No. 3, Payah Goyang, Radin Mas, River Valley Road, Shanghai Road, Tiong Bahru, Wishart Ravine, Woodneuk, Alexandra Swamp, Ballestier Plain, Cluny Road Ravine, Gallop Road, Grange Road, Holland Park Ravine No. 1, Holland Park Ravine No. 2, Holland Park No. 3, Holland Road, Melrose Area, Newton Road Area, Rochalie Drive, Swettenham Road Ravine, Tanglin Barracks No. 1, Tanglin Barracks No. 2, Tanglin Barracks No. 3, Tanglin Hill No. 1, Tanglin Hill No. 2, Fort Canning Hill, Henderson Road, Bukit Brown, Kampong Java Area, Moulmein Road Lot 59, Bukit Berlayer, Kramat Road, Swiss Cottage No. 1, Swiss Cottage No. 2, Thomson Road, Chancery Lane, Botanic Gardens, Tanglin Road Ravine, Spottiswoode Park, Pearls Hill, Ballestier Road Ravine, Chancery Lane No. 1, Chancery Lane No. 2, Irwell Bank, Mandalay Road, Mc Kenzie Road, Napier Road, Scotts Road No. 2, Serangoon Village, Economic Gardens, Mount Rosie, Mount Pleasant, Balmoral and Bukit Timah Roads, Sarkies Road, Thomson Road, Ballestier Road Ravine, Thomson Road Moulmein Road Area, Grove Road Bunded Area.

MOSQUITO SURVEYS.

Systematic survey was carried out over the whole Municipal Area throughout the year.

The following anopheline species were identified:—*A. maculatus*, *A. karwari*, *A. ludlowi*, *A. umbrosus*, *A. kochi*, *A. rossi*, *A. sinensis*, *A. barbirostris*, *A. punctulata*, and *A. fuliginosus*.

GENERAL ANTI-MOSQUITO WORK.

Two patrol gangs cleared and regraded 872,168 yards of earth drains and collected and disposed of 4,521 large baskets of empty tins, bottles etc.

OILING.

17,638 gallons of anti malarial mixture were used during the year in the Katong, Jalan Besar, and General Hospital areas.

2,187 gallons were used over other mosquito breeding grounds.

110 gallons of Izal and 30 lbs. of Paris Green were used to deal with mosquito breeding in concrete buildings under construction.

CONTROL OF DOMESTIC MOSQUITOS.

During the year mosquito larvae principally *Stegomyia* were found by Sanitary Inspectors in the course of their rounds in 23,286 houses and compounds or 31.39% of those visited.

356 notices were served during the year under the Destruction of Mosquitos Ordinance.

The following table shows the permanent drainage carried out since 1911.

| YEAR | Length of concrete channel in yards | Approximate length of concrete channel in miles | Length of subsoil pipes in yards | Approximate Length of subsoil pipes in miles |
|-----------|-------------------------------------|---|----------------------------------|--|
| 1911—1924 | 19,984 | 11½ | 62,663 | 35¾ |
| 1925 | 2,397 | 1½ | 7,739 | 4½ |
| 1926 | 5,050 | 2¾ | 6,253 | 3½ |
| 1927 | 5,702 | 2½ | 5,408 | 3¼ |
| Total | 33,133 | 18¼ | 82,063 | 47 |

INCIDENCE OF MALARIA.

Returns forwarded through the courtesy of the Principal Civil Medical Officer from the General Hospital and Tan Tock Seng Hospital and showing the residences of all malaria cases admitted to these hospitals during the year indicate that there is still a definite prevalence of malaria in the eastern and north eastern sections of the town area within easy reach of the tidal waters of the Kalang and Geylang Rivers.

I have the honour to be,

Sir,

Your obedient servant,

W. DAWSON,

Deputy Health Officer.

(73-D)

MUNICIPAL HEALTH OFFICE,

Singapore, 21st February, 1928.

To

THE MUNICIPAL HEALTH OFFICER,

SINGAPORE.

SIR,

I have the honour to submit my Eighth Annual Report upon the Municipal Markets their repair and maintenance and the inspection of foodstuffs exposed for sale in them. In addition a general supervision of all places where foodstuffs of any description are sold is maintained.

MUNICIPAL MARKETS.

With the erection of Geylang and Grange Road Markets and the conversion of Peoples Park Hawker's Shelters into a market there are now nine Municipal Markets well scattered over the town. Some 2,000 licensees ply their trades therein and with their assistants I should estimate at least 8,000 people are concerned in food distribution in these markets alone.

A. CLEANSING.

Sixty eight coolies under eight Market Keepers comprise the staff who attend to the daily flushing of fish sections, removal of garbage and the necessary whitewashing.

Once a year, (Chinese New Year) after due notice has been given the markets are subjected to a complete turn out and thoroughly cleansed. This took place on 2nd February and during the process the following vermin were caught and killed.

| | | Rats. |
|----------------|----|-------|
| Clyde Terrace | .. | 62 |
| Telok Ayer | .. | 81 |
| Kandang Kerbau | .. | 89 |
| Orchard Road | .. | 10 |
| Others | .. | Nil |

B. REPAIRS.

| | | |
|----------------------|----|--|
| Clyde Terrace Market | .. | Roof of poultry section repaired. Downspouts in main market renewed. |
| Ellenborough Market | .. | Woodwork of all Eating tables repaired and recovered with zinc. One new sliding gate fixed. Floors of fish and Eating section relaid. Fourteen fish slabs repaired. |
| Telok Ayer Market | .. | Floor of Eating section regraded. Stall 32 which collapsed was rebuilt with reinforced concrete. |

| | | |
|-----------------------|-------------------|--|
| Orchard Road Market | .. | Three awnings repaired and seven new ones fixed. Three sliding gates repaired. The whole floor is receiving constant attention for subsidence. Beef stall No. 3 and pork stall No. 49 repaired and recovered with zinc. |
| Peoples Park Shelters | Hawker's | The surrounding fencing was strengthened by a horizontal tie bar throughout its length. |
| All Markets | .. .. | General painting and colourwashing as requested in November last year was completed in March. Minor repairs to water and lighting services as and when indented for. |
| General | .. .. | The demolition of Dry goods section of Clyde Terrace was commenced in March. Electric light was installed in Clyde Terrace in June. |

C. UNSOUND FOODSTUFFS.

From all the markets 107,344 catties of unsound foodstuff were collected and destroyed. 150½ catties of measly pork were seized, 12 prosecutions instituted, which resulted in fines amounting to \$280.00 being imposed by the magistrate. Prosecutions are not always asked for as confiscation of unsound article is deemed sufficient punishment.

D. QUANTITY OF FOODSTUFFS.

With the exception of wet fish and pork the quantities are similar to last year. Wet fish shows a 20% increase while pork sales increased by 10%.

The value of recorded foodstuffs passing through the markets shows an increase to the value of over \$1,000,000.

E. PRICES.

Except for the usual seasonal rises prices were pretty much the same throughout the year, and on a par with last year's prices.

Below is a table of prices of staple articles of food showing the highest and lowest prices ruling for the year and compared with 1914 and the years since 1922 for which records are available.

| Article | Quantity per | 8.8.14. average price | 1922 | | 1923 | | 1924 | | 1925 | | 1926 | | 1927 | |
|-------------|--------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | Highest | Lowest | Highest | Lowest | Highest | Lowest | Highest | Lowest | Highest | Lowest | Highest | Lowest |
| | | | Cents | Cents | Cents | Cents | Cents | Cents | Cents | Cents | Cents | Cents | Cents | Cents |
| Beef | Kati | 24-27 | 51 | 28 | 50 | 40 | 43 | 39 | 48 | 45 | 52 | 42 | 52 | 42 |
| Mutton | " | 35 | 61 | 43 | 73 | 45 | 73 | 50 | 80 | 80 | 80 | 66 | 80 | 50 |
| Pork | " | 38 | 76 | 68 | 68 | 59 | 66 | 60 | 68 | 60 | 68 | 60 | 67 | 60 |
| Tea | " | 50 | 1.05 | 70 | 90 | 76 | 95 | 88 | 1.10 | 95 | 1.00 | 90 | 1.00 | 98 |
| Coffee Bean | " | 36 | 45 | 32 | 50 | 36 | 48 | 45 | 65 | 48 | 70 | 40 | 70 | 40 |
| Sugar | " | 07 | 17 | 11 | 20 | 11 | 17 | 12 | 13 | 08 | 12 | 09 | 12 | 09 |
| Salt | " | 02 | 05 | 04 | 04 | 03 | 04 | 03 | 03 | 03 | 03 | 03 | 04 | 03 |
| Potatoes | " | 8-5 | 15 | 10 | 14 | 09 | 14 | 09 | 12 | 10 | 12 | 10 | 14 | 09 |
| Yams | " | 03 | 12 | 03 | 06 | 03 | 08 | 03 1/2 | 08 | 04 | 08 | 04 | 12 | 04 |
| Onions | " | 6-7 | 18 | 08 | 13 | 07 | 12 | 07 | 12 | 06 | 14 | 08 | 18 | 07 |
| Geese | Each | \$1.50-\$2.10 | 4.50 | 2.25 | 3.50 | 2.50 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ducks | Dozen | \$5-\$7 | 15.50 | 9.00 | 13.20 | 9.00 | 11.40 | 7.80 | 15.00 | 8.40 | 14.40 | 9.96 | 15.60 | 10.80 |
| Pigeons | Pair | 75 | 1.60 | 80 | 1.50 | 1.00 | 1.20 | 1.00 | 1.30 | 80 | 1.40 | 85 | 1.40 | 90 |
| Eggs (hens) | Dozen | 30 | 84 | 52 | 60 | 48 | 54 | 50 | 72 | 35 | 65 | 43 | 90 | 60 |
| Capons | Kati | 42 | 1.00 | 45 | 87 | 50 | 78 | 68 | 85 | 70 | 90 | 70 | 1.00 | 75 |
| Fowls | Each | 40-70 | 2.75 | 80 | 2.10 | 80 | 60 | 46 | 2.10 | 70 | 3.00 | 1.50 | 2.50 | 1.80 |
| Rice | Gantang | \$6.50 | 54 | 50 | 55 | 45 | 63 | 50 | 56 | 52 | 60 | 54 | 57 | 59 |
| | | per picul | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang | per gantang |

F. REVENUE.

Although quite a large number of stalls at Clyde Terrace Market were abolished revenue has increased 7% due to wet fish sales. The other markets with the exception of Telok Ayer also show increases, which are shown in the table below.

| Market | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 |
|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| Clyde Terrace .. | 134,723 52 | 131,544 61 | 142,099 13 | 144,159 61 | 150,812 40 | 178,753 52 | 181,320 66 |
| Ellenborough .. | 139,257 33 | 121,651 39 | 111,677 12 | 109,563 23 | 110,419 43 | 120,022 76 | 122,379 82 |
| Telok Ayer .. | 42,790 21 | 44,282 44 | 43,830 52 | 38,317 92 | 35,726 99 | 36,678 21 | 37,042 47 |
| Orchard Road .. | 13,927 04 | 14,380 00 | 14,740 00 | 14,403 00 | 14,275 00 | 13,496 00 | 14,088 00 |
| Kandang Kerbau .. | 13,632 43 | 16,356 50 | 15,433 00 | 16,647 50 | 17,835 00 | 17,947 00 | 18,956 00 |
| Rochore .. | 10,752 62 | 10,685 00 | 9,155 00 | 9,305 00 | 9,330 00 | 9,664 00 | 8,650 00 |

5 per cent Commission.

| Market | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 |
|------------------|------------|------------|------------|------------|------------|------------|
| | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| Clyde Terrace .. | 56,635 61 | 71,661 13 | 74,272 61 | 81,793 40 | 106,072 52 | 122,158 66 |
| Ellenborough .. | 70,791 47 | 64,123 12 | 64,245 23 | 66,911 43 | 76,598 76 | 77,826 82 |
| Telok Ayer .. | 4,438 44 | 3,920 52 | 3,038 92 | 2,841 99 | 2,971 21 | 2,769 47 |
| Total .. | 131,865 52 | 139,704 77 | 141,556 76 | 151,546 82 | 185,642 49 | 202,754 95 |

G. LICENSES.

On the 1st January all licenses are renewed and no difficulty is experienced. This means that over 1,700 photographs in duplicate are received pasted on cards and in registers and initialled.

H. STAFF.

This now consists of eight market Keepers and sixty eight coolies, the additions being necessary for controlling the new markets. Market Keeper Collick was appointed on 1st February and Market Keeper Armstrong was transferred from the sanitary inspector's staff on 1st September.

Three Market Keepers were granted leave during the year, Market Keeper Moore taking 3 months after an illness which debilitated him.

Twenty one coolies reported sick and were treated, five were sent to Hospital with Chicken pox and discharged cured. All have returned to work.

I. MARKET BYLAWS.

There were 137 prosecutions for breaches of the byelaws and fines amounting to \$486.00 were inflicted. In future licenses will be endorsed for petty offences. Forfeiture of license for further offences will, I think, be a greater deterrent than small fines, besides saving time wasted at Court.

J. GENERAL.

Geylang Market which hitherto was occupied free was brought into line with the other markets on the 1st February. Peoples Park Hawker's Shelters were also put under my care. No licenses were issued here in January but notices were posted that applications for plots would be received. Over 400 were sent in and a ballot for stalls was held on 25th January in presence of Health Officer and two Chinese Commissioners. Photos having been received from drawers of plots the shelters were opened on 17th February. The improvement in orderliness was marked, but the Cantonese women sellers are still very troublesome, although the Protector of Chinese was called in to impress upon them the necessity for obeying the regulations.

At night the sheds are thrown open to the public and constitute a large open air restaurant. During the Hylam riots they were the centre of a battle in which the utensils of the stalls were freely used as missiles.

Grange Road Market was opened on the 17th November rent free and is but poorly patronized at present.

Clyde Terrace Market extension. As reported in my last Annual Report the re-arrangements proposed were put into effect after Chinese New Year. Two rows of fish slabs were demolished making room for mutton stalls and the whole of the Dry goods section was transferred to the old vegetable section which had already taken up its position in the extension over the sea. Further improvements, such as raising the roof, making a jack-roof and partitioning off the Eating section, which will go a long way towards improving the light and ventilation are, I believe, approved. Positions in the new arrangement were again balloted for and what gave promise of a lively source of trouble was effected without disturbance.

(1) No special reports were called for this year.

(2) 837 letters were received, mostly applications for stalls and all were satisfactorily disposed of.

(3) 1,882 visits were paid to the Markets during the year.

(4) Rochore Market. All stall holders were personally served with notices to quit as the market which is 73 years old and obsolete is to be demolished to make room for road widening operations.

TOWN.

Inspection of shops, stores and hawker's pitches in the Municipal area resulted in the collection and destruction of 30,233 cases, packages etc. of unsound foodstuffs. This was achieved without any prosecutions.

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I attach the usual summaries and tables showing scope and extent of my duties during the period under review.

I have the honour to be,

Sir,

Your obedient servant,

M. N. MACMAHON,

Cert. R. San. Inst.,

Food and Market Inspector

SUMMARY OF VACANT STALLS AS ON 31ST DECEMBER, 1927.

| FEE. | MARKET | \$30 | \$15 | \$15 | \$12 | \$15 | Pork | \$10 | \$6 | \$15 | \$10 | \$5 | \$15 | \$30 | \$5 | \$5 | \$10 | \$7 | \$5 | TOTAL No. |
|-------------------|--------|--------------|---------------------------|------|--------|------|------|----------------|---------------|---------|----------------------------|------|------------------------------------|--------|------|---------------------------------|---------|-----|-----|--------------|
| | | Dry goods | Salted Vege- tables | Beef | Mutton | | | Curry stuff | Bean cakes | Poultry | Vege- tables & fruit | Eggs | Money Changer and Cigar : | Eating | Fish | Shell Fish and Tripang | HAWKERS | | | Vacant |
| Clyde Terrace .. | .. | — | — | — | 2 | — | — | — | — | 6 | — | — | — | — | 10 | — | 3 | — | — | 21 |
| Ellenborough .. | .. | — | — | — | — | — | — | — | — | 8 | 9 | — | — | — | 2 | — | — | — | — | 19 |
| Telok Ayer .. | .. | 9 | — | — | — | — | 4 | 1 | 1 | 2 | 17 | — | — | — | 1 | — | — | — | 7 | 42 |
| Orchard Road .. | .. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Kandang Kerbau .. | .. | 4 | 1 | 1 | — | — | — | — | — | — | — | — | — | — | 1 | — | — | — | — | 7 |
| Rochore .. | .. | 2 | — | — | — | — | — | — | — | — | 4 | — | — | 3 | 8 | — | 15 | — | — | 32 |

M. N. MACMAHON,

Cert. R. San. Inst.,

Food and Market Inspector.

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Return of some of the Foodstuffs passing through markets with their Approximate Value during the year 1927.

| MARKET | Wetfish ctts. | Boiled fish ctts. | Shell fish ctts. | Beef ctts. | Mutton ctts. | Pork ctts. | HEAD | | | | | Turkeys | Bean cakes ctts. | Bean Sprouts ctts. | Approximate Value \$ cts. |
|------------------|------------------|-------------------------|------------------------|---------------|-----------------|---------------|---------|--------|-------|---------|---------|---------|------------------------|--------------------------|------------------------------------|
| | | | | | | | Fowls | Capons | Geese | Ducks | Pigeons | | | | |
| Clyde Terrace .. | 9,743,457 | 36,904 | 4,161 | 387,021 | 185,220 | 320,227 | 30,580 | .. | 871 | 21,263 | 5,202 | .. | 305,979 | 20,234 | 3,067,360 33 |
| Ellenborough .. | 5,239,758 | 62,902 | 225,500 | 24,734 | .. | 908,470 | 88,872 | 8,470 | 1,881 | 102,789 | .. | .. | 109,064 | 103,377 | 2,438,277 94 |
| Telok Ayer .. | 146,747 | .. | 31,500 | 39,851 | 90,348 | 219,365 | 78,877 | .. | 650 | 23,455 | 6,813 | 362 | .. | .. | 398,794 32 |
| Orchard Road .. | 453,920 | 36,567 | .. | 277,161 | 33,955 | 291,988 | 40,294 | 193 | 45 | 4,133 | 4,435 | .. | 34,447 | 36,609 | 521,336 05 |
| Kandang Kerbau | 922,460 | 32,739 | 11,246 | 163,878 | 75,927 | 561,108 | 65,579 | 200 | .. | 23,654 | .. | .. | 31,226 | 39,559 | 817,136 86 |
| Rochore .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Total .. | 16,506,342 | 169,112 | 272,407 | 892,645 | 385,450 | 2,301,158 | 304,202 | 8,863 | 3,447 | 175,294 | 16,450 | 362 | 480,716 | 199,779 | 7,242,935 50 |

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

UNSOOUND FOODSTUFFS DESTROYED DURING THE YEAR 1927.

| MARKET | Wetfish ctts. | Saltfish ctts. | Beef ctts. | Mutton ctts. | Pork ctts. | Vegetables ctts. | Fruits ctts. | Tinned | | Bottles preserves No. | Eggs No. | Miscellane- ous | TOTAL ITEMS |
|-------------------|------------------|-------------------|---------------|-----------------|---------------|---------------------|-----------------|--------|---------------|-----------------------------|----------|--------------------|----------------|
| | | | | | | | | Cases | Goods Tins | | | | |
| Clyde Terrace .. | 10,388 | 1,058 | 3,562 | .. | 145 | 24,254 | 3,744 | .. | 24 | .. | 4,284 | 208 | .. |
| Ellenborough .. | 4,877 | 135 | .. | .. | 125 | 6,441 | 30 | .. | .. | .. | 909 | 16,252 | .. |
| Telok Ayer .. | 42 | 86 | 2 | .. | .. | 8,695 | 4,476 | .. | 38 | .. | .. | 138 | .. |
| Kandang Kerbau | 1,343 | 136 | 13 | 39 | 139 | 4,235 | 627 | .. | 6 | .. | 105 | 4 | .. |
| Orchard Road .. | 235 | 57 | 3 | 4 | 104 | 3,566 | 3,984 | .. | .. | .. | .. | 4 | .. |
| P. P. H. Shelters | 379 | 245 | 71 | .. | 432 | 924 | 30 | .. | .. | .. | 652 | 94 | .. |
| | 17,264 | 1,717 | 3,651 | 43 | 945 | 48,115 | 12,891 | .. | 68 | .. | 5,950 | 16,700 | 107,344 |
| TOWN .. | 112 | 2,236 | .. | 2 | 564 | 1,935 | .. | 4,079 | 11,091 | 883 | .. | 9,331 | 30,233 |
| TOTAL .. | 17,376 | 3,953 | 3,651 | 45 | 1,509 | 50,050 | 12,891 | 4,079 | 11,159 | 883 | 5,950 | 26,031 | 137,577 |

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

MARKETS.

Return of Prosecutions for the Year 1927.

| MARKETS | Prosecutions | Convictions | Postponed | Withdrawn | Warrants | Total Fines |
|------------------------------------|--------------|-------------|-----------|-----------|----------|-------------|
| | | | | | | \$ cts. |
| Clyde Terrace | | | | | | |
| M. O. 192 .. | 34 | 30 | .. | 4 | .. | 175 00 |
| Market Bye-laws .. | 8 | 8 | .. | .. | .. | 25 00 |
| Ellenborough | | | | | | |
| M. O. 192 .. | 3 | 3 | .. | .. | .. | 45 00 |
| Market Bye-laws .. | 26 | 26 | .. | .. | .. | 109 00 |
| Telok Ayer | | | | | | |
| M. O. 192 .. | .. | .. | .. | .. | .. | .. |
| Market Bye-laws .. | 27 | 20 | .. | 7 | .. | 78 00 |
| Kandang Kerbau | | | | | | |
| M. O. 192 .. | 5 | 5 | .. | .. | .. | 72 00 |
| Market Bye-laws .. | 41 | 40 | .. | 1 | .. | 163 00 |
| Orchard Road | | | | | | |
| M. O. 192 .. | .. | .. | .. | .. | .. | .. |
| Market Bye-laws .. | 17 | 17 | .. | .. | .. | 83 00 |
| Rochore | | | | | | |
| M. O. 192 .. | .. | .. | .. | .. | .. | .. |
| Market Bye-laws .. | .. | .. | .. | .. | .. | .. |
| Peoples Park Hawker Shelter | | | | | | |
| M. O. 192 .. | .. | .. | .. | .. | .. | .. |
| Market Bye-laws .. | 18 | 18 | .. | .. | .. | 38 00 |
| Town | | | | | | |
| M. O. 192 .. | .. | .. | .. | .. | .. | .. |
| M. O. 186 .. | .. | .. | .. | .. | .. | .. |
| Grand Total .. | 179 | 167 | .. | 12 | .. | \$788 00 |

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the year 1927.

| Date | Name | Address | By whom Arrested | Offence | By whom Tried | Results | Remarks |
|---------|------------------|--------------------|------------------|--------------------------------|---------------|----------------|---------|
| 20/1/27 | Pakain .. | 164 Joo Chiat Road | P. C. 390 | Selling milk without a licence | 3rd Magste. | Fined \$ 25.00 | |
| 28/4/27 | Rangah Singh .. | Mac.Pherson Road | P. C. 291 | Do. | 2nd " | " 10.00 | |
| " | Paramput .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Doonath Singh .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Tarian .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Rambaka .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Gala .. | Do. | " " | Do. | " " | " 12.00 | |
| " | Sew dahar .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Charied .. | Do. | " " | Do. | " " | " 15.00 | |
| " | Sehdio .. | Do. | " " | Do. | " " | " 10.00 | |
| " | Balseh Math .. | Do. | " " | Do. | " " | " 5.00 | |
| | | | | | | \$127.00 | |

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the year 1927.

| Date | Name | Address | By whom Arrested | Offence | By whom Tried | Results | Remarks |
|---------|---------------------------|-------------------|------------------|--------------------------------------|------------------------|---|---|
| | Kuyamee | 74 Dunlop Street | Surrendered | For selling adulterated milk (27.1%) | Brought 1st Magste. | forward \$127 Fined \$15.00 and costs | Case No. 857, warrant No. 10, summons No. 2,367 of 1926 |
| 7/4/27 | Saphagit | 77 Dunlop Street | P. C. 397. | Selling milk without a licence | Magste. Bull. | Fined \$ 10.00 | |
| " | Bantee Singh | 73 Syed Alwee Rd. | " 522 | Do. | 2nd Magste. | " 10.00 | |
| 27/4/27 | Darsarat alias Bananan | Unknown | W. E. Jansen | Do. | " 28/4/27. | withdrawn By order of C.S.I. | Case No. 1,676 |
| " | Amawas | Do. | " " | Do. | " " | Fined \$ 15.00 | " " 1,677 |
| " | Pykerie | Do. | " " | Do. | " " | " 15.00 | " " 1,678 |
| " | Madodarie Singh | Do. | " " | Do. | " " | " 10.00 | " " 1,678 |
| 4/5/27 | Nariss Rai | Do. | P. C. 33 | Do. | " " | " 10.00 | |
| | | | | | | \$212.00 | |

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the year 1927.

| Date | Name | Address | By whom Arrested | Offence | By whom Tried | Results | Remarks |
|----------|----------------|-------------------------------|------------------|--------------------------------|-------------------------------|--|---------|
| 1/6/27 | Saphadjit | .. 77 Dunlop Street | P. C. 617 | Selling milk without a licence | <i>Brought</i> 2nd Magste. | <i>forward</i> \$212 Fined \$ 20.00 | |
| 9/6/27 | Ragnard Singh | — | " 798 | Do. | 3rd " | " 20.00 | |
| 10/6/27 | Dasara Singh | — | " 218 | Do. | " " | " 25.00 | |
| " | Singaram | — | " 798 | Do. | " " | " 15.00 | |
| 21/6/27 | Koldari Singh | .. 75 Dunlop Street | " 742 | Do. | 2nd " | " 12.00 | |
| 24/6/27 | Mooglal | — | " 859 | Do. | " " | " 15.00 | |
| " | Das, Singh | — | " 859 | Do. | " " | " 15.00 | |
| " | Mandandi | — | " 881 | Do. | " " | " 20.00 | |
| 25/8/27 | Tong Singh | .. Vacant Land Keppel Road | " 996 | Unlicensed coffee stall | " " | " 15.00 | |
| 20/12/27 | Batharoo Singh | 79 Dunlop Street | " 162 | Selling milk without a licence | Magste. Dakers | " 10.00 | |
| | | | | | | <u>\$379.00</u> | |

H. J. BENJAFIELD,
Chief Sanitary Inspector.

(86-D)

RETURN OF LICENCES (OFFENSIVE TRADES) ISSUED
DURING THE YEAR 1927.

| Nature of License | | | Number issued | Amount \$ cts. | REMARKS |
|-------------------------|----|----|------------------|--------------------------|------------------|
| Blachan Store | .. | .. | 11 | 264 00 | |
| Brick Kiln | .. | .. | .. | .. | |
| Dye House | .. | .. | 8 | 86 00 | 1 @ 2 months fee |
| Drying and Sorting Fish | .. | .. | 5 | 60 00 | |
| Fish Curing | .. | .. | .. | .. | |
| Fruit Preserving | .. | .. | 7 | 350 00 | |
| Knacker's Yard | .. | .. | 1 | 12 00 | |
| Lime Making | .. | .. | .. | .. | |
| Lye Making | .. | .. | .. | .. | |
| Laundry | .. | .. | 319 | 319 00 | |
| Offal Boiling | .. | .. | .. | .. | |
| Pottery Works | .. | .. | .. | .. | |
| Private Market | .. | .. | 1 | 1 00 | |
| Rags and Bones Store | .. | .. | 2 | 12 00 | |
| Sago Factory | .. | .. | 4 | 200 00 | |
| Sheep or Goat Pens | .. | .. | 4 | 32 00 | 2 @ 4 months fee |
| Sugar Boiling | .. | .. | 10 | 500 00 | |
| Soap Boiling | .. | .. | 11 | 123 00 | 1 @ 3 months fee |
| Tannery | .. | .. | 13 | 650 00 | |
| Cowsheds | .. | .. | 8 | 205 00 | |
| Cattle Sheds | .. | .. | 34 | 890 00 | |
| Pony Stables | .. | .. | 20 | 163 00 | |
| Piggery | .. | .. | 1,390 | 2,780 00 | |
| Total .. | | | 1,848 | \$6,647 00 | |

H. J. BENJAFIELD,
Chief Sanitary Inspector.

RETURN OF NOTICES SERVED AND COMPLIED WITH ETC., DURING THE YEAR 1927.

| Nature of Notice. | Brought forward from last year | Served during the year | Total | Complied with during the year | Carried forward to next year | REMARKS. |
|---------------------|--------------------------------|------------------------|--------|-------------------------------|------------------------------|------------------|
| Nuisance | 266 | 1,054 | 1,320 | 843 | 124 | (353 Cancelled). |
| Intimation | 572 | 3,629 | 4,201 | 3,748 | 338 | (115 Cancelled). |
| Limewash | 766 | 5,435 | 6,201 | 6,163 | 38 | |
| Latrine | .. | 127 | 127 | 81 | 46 | |
| Drain | 4 | 20 | 24 | 23 | 1 | |
| Well | 2 | 34 | 36 | 27 | 8 | (1 Cancelled). |
| Abatement Order | .. | 5 | 5 | 2 | 1 | (2 Cancelled). |
| Mandatory Order | .. | 4 | 4 | 1 | 3 | |
| Prohibition Order | .. | 3 | 3 | 3 | .. | |
| Insanitary Cubicles | .. | 5 | 5 | 5 | .. | |
| Dest. of Mosquito | 462 | 316 | 778 | 344 | 434 | (A. M. Dept.) |
| Total | 2,072 | 10,632 | 12,704 | 11,240 | 993 | (471 Cancelled). |

(87-D)

H. J. BENJAFIELD,
Chief Sanitary Inspector.

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1927.

| OFFENCES. | | Division A. (South) Districts 1 to 13 | | | | Division B. (North) Districts 14 to 25 | | | |
|--|---------|---------------------------------------|-----------|-------------|------------|--|-----------|-------------|------------|
| | | TOTAL | | | | TOTAL | | | |
| | | Prosecutions | Withdrawn | Convictions | Fines \$ | Prosecutions | Withdrawn | Convictions | Fines \$ |
| Municipal Ordinance 135. | | | | | | | | | |
| Filthy premises | .. .. . | 215 | 12 | 203 | \$1,216 00 | 172 | 12 | 160 | \$1,096 00 |
| Allowing premises to be overcrowded | .. .. . | 6 | — | 6 | 80 00 | .. | .. | .. | .. |
| Non-compliance with Nuisance Notice | .. .. . | 59 | 16 | 43 | 81 00 | 101 | 30 | 71 | 356 00 |
| Non-compliance with Nuisance Order | .. .. . | 1 | 1 | .. | .. | 2 | 2 | .. | .. |
| Non-compliance with Well Notice | .. .. . | 2 | .. | 2 | .. | 4 | 2 | 2 | 4 00 |
| Opening Well without permission | .. .. . | 2 | .. | 2 | 35 00 | 5 | .. | 5 | 17 00 |
| Limewash notice not complied with | .. .. . | 3 | 2 | 1 | 5 00 | 14 | 1 | 13 | .. |
| Latrine etc. notice not complied with | .. .. . | 2 | 1 | 1 | .. | 1 | .. | 1 | .. |
| Using nightsoil/or urine as manure | .. .. . | 5 | .. | 5 | 16 00 | 6 | .. | 6 | 30 00 |
| Using Fish as manure | .. .. . | 3 | .. | 3 | 1 50 | 6 | .. | 6 | 6 00 |
| Offensive matter flowing into Public Drain | .. .. . | .. | .. | .. | .. | 1 | .. | 1 | 5 00 |
| Unlicensed Offensive Trades | .. .. . | 61 | 8 | 53 | 307 00 | 88 | 23 | 65 | 531 00 |
| Carried forward .. | | 359 | 40 | 319 | \$1,741 50 | 400 | 70 | 330 | \$2,045 00 |

Return of Prosecution for the Year 1927.—(Continued.)

| OFFENCES. | Division A. (South) Districts 1 to 13 | | | | Division B. (North) Districts 14 to 25 | | | |
|--|---------------------------------------|-----------|-------------|------------|--|-----------|-------------|------------|
| | TOTAL | | | | TOTAL | | | |
| | Prosecutions | Withdrawn | Convictions | Fines \$ | Prosecutions | Withdrawn | Convictions | Fines \$ |
| <i>Brought forward</i> .. | 359 | 40 | 319 | \$1,741 50 | 400 | 70 | 330 | \$2,045 00 |
| License not exhibited 371 | .. | .. | .. | .. | 2 | .. | 2 | 11 00 |
| Breaches of offensive Trades Byelaws | .. | .. | .. | .. | 3 | 2 | 1 | 2 00 |
| Byelaws-Sections 57 & 204 M. O. 135. | | | | | | | | |
| Unlicensed Foodshops | 62 | 14 | 48 | 267 00 | 190 | 62 | 128 | 2,508 00 |
| Unlicensed Milk Vendors | 12 | .. | 12 | 182 00 | 17 | 1 | 16 | 202 00 |
| Recovery of Daily fines | .. | .. | .. | .. | .. | .. | .. | .. |
| Employing women without permission of H. O. .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Breaches of the Piggery Byelaws | 12 | 1 | 11 | 26 00 | 6 | .. | 6 | 70 00 |
| Unlicensed Piggeries | 26 | 2 | 24 | 58 00 | 62 | 9 | 53 | 466 00 |
| Filthy Stables, Cowsheds etc. | 4 | .. | 4 | 23 00 | 2 | 1 | 1 | 3 00 |
| Breaches of the Foodshop Byelaws | 147 | 13 | 134 | 1,013 50 | 65 | 7 | 58 | 290 50 |
| <i>Carried forward</i> .. | 622 | 70 | 552 | \$3,311 00 | 747 | 152 | 595 | \$5,597 50 |

HEALTH DEPARTMENT.

Return of Prosecution for the Year 1927.—(Continued.)

| OFFENCES. | Division A. (South) Districts 1 to 13 | | | | Division B. (North) Districts 14 to 25 | | | |
|--|---------------------------------------|-----------|-------------|------------|--|-----------|-------------|------------|
| | TOTAL | | | Fines \$ | TOTAL | | | Fines \$ |
| | Prosecutions | Withdrawn | Convictions | | Prosecutions | Withdrawn | Convictions | |
| <i>Brought forward</i> .. | 622 | 70 | 552 | \$3,311 00 | 747 | 152 | 595 | \$5,597 50 |
| Markets and Slaughter Houses. | | | | | | | | |
| Unsound Food Section 192 | 8 | 1 | 7 | 195 00 | 69 | 10 | 59 | 367 00 |
| Slaughtering Animals except in Abattoirs .. 197 | .. | .. | .. | .. | .. | .. | .. | .. |
| Selling vegetables within 50 yards of market .. 186 | .. | .. | .. | .. | .. | .. | .. | .. |
| Market Byelaws | 71 | 7 | 64 | 225 00 | 98 | 5 | 93 | 411 00 |
| Hawkers-Section 187 & 188 and Byelaws made there-under. | | | | | | | | |
| Stalls in unspecified Streets Section 187 | 1 | .. | 1 | 5 00 | .. | .. | .. | .. |
| Unlicensed Hawkers | 35 | .. | 35 | 89 00 | 54 | .. | 54 | 295 00 |
| Hawkers Byelaws | .. | .. | .. | .. | .. | .. | .. | .. |
| Sale of Food and Drugs Ordinance No. 139. | | | | | | | | |
| Selling Adulterated Milk Section 11-1 | 7 | .. | 7 | 255 00 | 8 | 1 | 7 | 180 00 |
| Selling Milk deficient in fat 11-1 | .. | .. | .. | .. | 1 | .. | 1 | 10 00 |
| <i>Carried forward</i> .. | 744 | 78 | 666 | \$4,080 00 | 977 | 168 | 809 | \$6,860 50 |

HEALTH DEPARTMENT.

Return of Prosecution for the Year 1927.—(Continued.)

| OFFENCES. | Division A. (South) Districts 1 to 13 | | | | Division B. (North) Districts 14 to 25 | | | |
|---|---------------------------------------|-----------|-------------|------------|--|-----------|-------------|------------|
| | TOTAL | | | | TOTAL | | | |
| | Prosecutions | Withdrawn | Convictions | Fines \$ | Prosecutions | Withdrawn | Convictions | Fines \$ |
| <i>Brought forward</i> .. | 744 | 78 | 666 | \$4,080 00 | 977 | 168 | 809 | \$6,860 50 |
| Q. and P. of Disease Ordinance No. 157. | | | | | | | | |
| Failing to report case of Inf. Disease .. Section 3 | .. | .. | .. | .. | 3 | .. | 3 | 45 00 |
| Moving patient without permission .. " | .. | .. | .. | .. | .. | .. | .. | .. |
| Exposing patient while suffering .. " | .. | .. | .. | .. | .. | .. | .. | .. |
| Conveying patient in public vehicle .. " | .. | .. | .. | .. | .. | .. | .. | .. |
| Failing to have child vaccinated .. " | 3 | 2 | 1 | .. | 3 | 2 | 1 | .. |
| Failing to bring child for inspection .. " | .. | .. | .. | .. | .. | .. | .. | .. |
| Registration Births and Deaths Ordinance No. 59. | | | | | | | | |
| Failing to Register Births .. Section 11 | 16 | 2 | 14 | .. | 13 | 1 | 12 | 5 00 |
| Failing to Register Deaths .. " 11-1 | 2 | .. | 2 | .. | 3 | 1 | 2 | .. |
| <i>Carried forward</i> .. | 765 | 82 | 683 | \$4,080 00 | 999 | 172 | 827 | \$6,910 50 |

HEALTH DEPARTMENT.

Return of Prosecutions for the Year 1927.

| OFFENCES | Division A. (South) Districts 1 to 13 | | | | Division B. (North) Districts 14 to 25 | | | |
|---|---------------------------------------|-----------|-------------|------------|--|-----------|-------------|------------|
| | TOTAL | | | Fines \$ | TOTAL | | | Fines \$ |
| | Prosecutions | Withdrawn | Convictions | | Prosecutions | Withdrawn | Convictions | |
| <i>Brought forward</i> .. | 765 | 82 | 683 | \$4,080 00 | 999 | 172 | 827 | \$6,910 50 |
| Destruction of Mosquitos Ordinance No. 174. | | | | | | | | |
| Failing to comply with notice Section 1-8 | 4 | 1 | 3 | 55 00 | 6 | 4 | 2 | 5 00 |
| Recovery of costs of work done " 7-1 | .. | .. | .. | .. | .. | .. | .. | .. |
| Breaches of Section " 229 | 6 | 2 | 4 | 10 00 | 38 | 17 | 21 | .. |
| Breaches of Section " 209 | 1 | 1 | .. | .. | .. | .. | .. | .. |
| Total .. | 776 | 86 | 690 | \$4,145 00 | 1,043 | 193 | 850 | \$6,915 50 |

Summary.

| | | |
|---------------------|----|-------------|
| * Total Inspections | .. | \$74,169.00 |
| " Prosecutions | .. | 1,819.00 |
| " Withdrawn | .. | 279.00 |
| " Convictions | .. | 1,540.00 |
| " Fines | .. | \$11,060.50 |

N.B.—Costs are not included in the amount of fines.

H. J. BENJAFIELD,
Chief Sanitary Inspector.

